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#1 Atari Computer Magazine

Antic

The ATARI® Resource

JULY 1985 VOLUME 4, NUMBER 3

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INSIDE: 8 Type-In Programs

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```
1 PRINT "WHAT GRAPHICS
 MODE(9,10,11)";:INPUT
A
29 REM LIGHTSHOW #2
30 GRAPHICS A:FOR I=0 T
O 79:FOR J=0 TO 79:COLO
R I+J/4+4
40 PLOT I,79-J:PLOT J,7
9-I:PLOT 79-J,79-I:PLOT
 79-I,79-J:PLOT 79-I,J:
PLOT 79-J,I:PLOT I,J:PL
OT J,I
50 NEXT J:NEXT I
60 GOTO 60
```

```
5 Z=0
10 GRAPHICS 11
20 FOR I=1 TO 79
30 Z=Z+1:IF Z>9 THEN Z=
1
35 COLOR Z
40 PLOT I,X:DRAWTO 79-I
,X
50 PLOT I,190-X:DRAWTO
79-I,190-X
60 X=X+2:IF X>190 THEN
X=0
70 NEXT I:Z=Z+1:GOTO 10
```

```
10 GRAPHICS 8+16
20 SETCOLOR 2,10,0
30 FOR I=1 TO 190 STEP
7
40 PLOT I,0:DRAWTO 300,
I
45 PLOT 300-I,190:DRAWT
O 0,190-I
50 PLOT 0,190-I:DRAWTO
I,0
55 PLOT 300,I:DRAWTO 30
0-I,190
60 NEXT I
65 GOTO 65
```

```
10 GRAPHICS 11
20 FOR X=0 TO 78
30 C=C+1:COLOR C:IF C=1
27 THEN C=0
40 PLOT X,Y:DRAWTO 78-X
,Y:DRAWTO 78-X,191-Y:DR
AWTO X,191-Y:DRAWTO X,Y
50 Y=Y+2:IF Y>191 THEN
Y=0
60 NEXT X:GOTO 20
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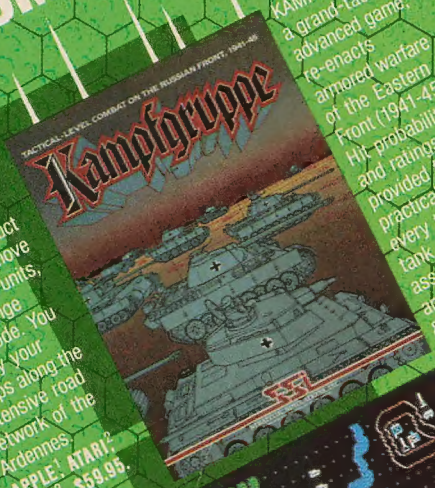

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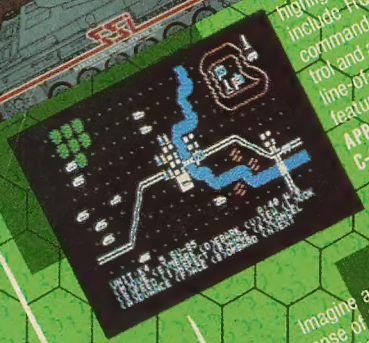

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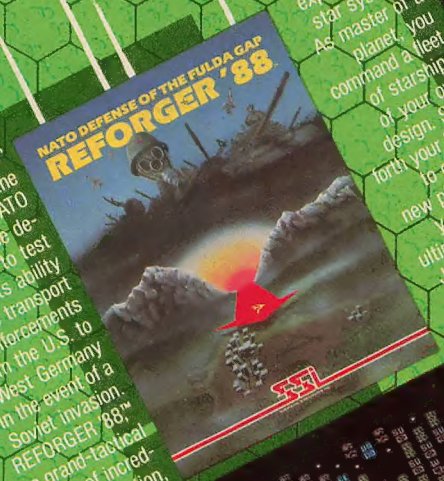

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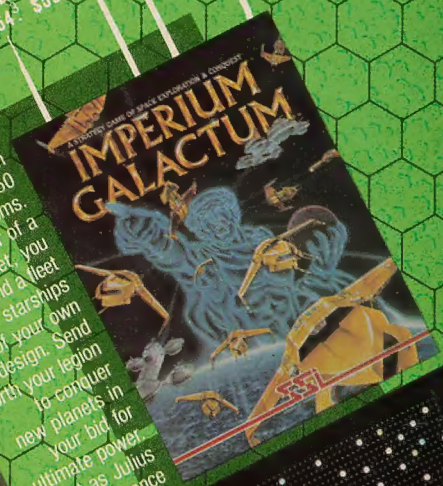

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[3] On 64K diskette for the Commodore 64.

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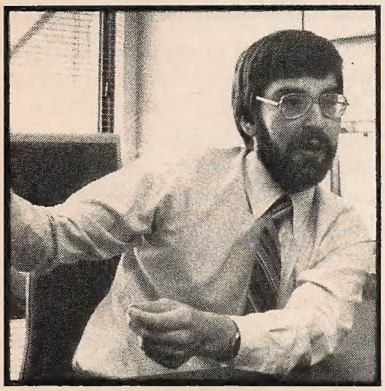

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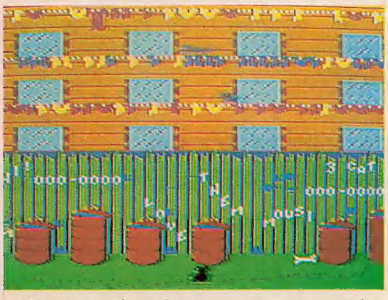

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i/o board

We wish we could personally answer every letter from our readers, but **ANTIC** *Magazine and CompuServe ANTIC ONLINE receive far too much mail to make this possible. Our priority must be to answer in print (and online) questions that are of greatest interest to a significant number of readers!*

600XL EXTINCTION?

As a concerned owner of the 600XL, I'd like to know what happened to it. Will there be a 64K expansion module from Atari? I hope Atari doesn't forget the thousands of 600XL owners.

Steve Bowen
Penobscot, MA

Although Atari is not planning to produce more 600XL's, it is not a totally extinct machine. With the 64K expansion module, available from Microbits Peripheral Products, it is a viable computer. In fact, we use one daily at **Antic.**
—ANTIC ED

SYNCALC MARCHES ON

I want to congratulate you on the February article about taxes and SynCalc. The template was so useful that I adapted it for state and local taxes as well.

N. Clark
Lansing, MI

Thank you for the kudos. ***Antic*** *is currently looking for more SynCalc templates. We'd like to see templates for Adjustable Rate Mortgages and for Long Distance Phone Service Cost comparisons. If you have such, please send it on a disk along with a short note about your finance credentials.* —ANTIC ED

SOFTWARE REBATE

Datasoft recently informed us of a special rebate they're offering through August 31, 1985. Specially marked software packages will include $5 rebate coupons. The software in the offer includes **Bruce Lee, Conan, Dallas Quest, PacMan, Dig Dug, Pole Position, Mr. Do, Zaxxon, Letter Wizard.**

ATARI AMNESIA

While playing SSI's **Computer Baseball** on my 800XL, I got an Error 2 (memory insufficient) on line 705 every time I brought in a relief pitcher. I ran the Atari self-diagnostic memory test and found that only 40 of the 48 little boxes appeared and turned green. Can you help?

Dennis Possi
Singapore

We don't know why this program is filling your memory, but you might try the memory diagnostic with the disk drive turned off and BASIC disabled. BASIC uses 8K, as does DOS. Either of these could account for your missing boxes.
—ANTIC ED

BEATING BRUCE LEE

Have you people out there got the blues about Bruce Lee? All I ever hear about Bruce Lee are complaints about the long introduction. Didn't anyone ever hear about the [SPACE] key? It's the long, skinny key at the bottom of the keyboard. Press it, and BINGO! the introduction ends.

Also, if you find that you don't have enough "free guys", then when you get to the room where you get the first free, keep running in and out of the room and frees will appear the first five times you do this.

Evan Gold
Brooklyn, NY

We assure you that ***Antic*** *pressed the [SPACE] bar and everything else on the Atari keyboard not once but many times in our vain attempt to escape from Bruce Lee's smiling face. Apparently you are lucky enough to own a later version of the game which allows you to avoid the introduction. Wanna trade?*—ANTIC ED

continued on page 8

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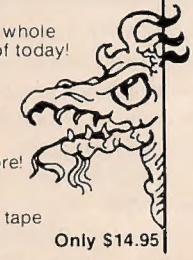

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SPINNAKER RESPONDS

This letter from the chairman of Spinnaker Software came in response to the May 1985 ***Antic*** *editorial recommending that readers write to software companies that don't convert hit programs for the Atari.*—ANTIC ED

I would like to clarify a few of the issues surrounding software development for the Atari.

The decision of which machines to support with software is never simple. Before bringing a new title to market, we weigh the growth factors (how well will the machine sell?), the market factors (will those owners be interested in our software?), and the economic factors (how much will it cost us to develop a title for that machine?).

I can assure you that the decision is one of the most difficult we face in developing software, and it is never made lightly.

With this year's introduction of the new Atari machines, the decision takes a new turn. We are talking, right now, with Atari about developing products for the new Atari machines. Such develoment would make it more economically feasible to support both ends of the Atari line.

I would like Antic readers to know that we at Spinnaker do understand their needs, and that we're working hard to provide them with the best product on the market. We have, in the past, supported all of our customers with a wide variety of exciting new titles every year, and we will continue to do so.

Please encourage your readers to write. We always appreciate our customers' interest.

William Bowman
Chairman, Spinnaker Software

THE FORTH DIMENSION

The FORTH Interest Group (you guessed it, FIG) recently announced its author recognition program. For more information on this 4,800-member non-profit organization, contact FIG's hotline, (415) 962-8653, or write to them at P.O. Box 1105, San Carlos, CA 94070.

Type GO ANTIC when you log onto CompuServe in June, and you'll be able to read our on-the-spot bulletins direct from the Consumer Electronics Show in Chicago—with all the details about the new Atari products being showcased.

Not only that, you will also find an extensive preview of our groundbreaking August **TeleComputer** issue. You'll see descriptions—or even actual excerpts—from upcoming August articles that are must reading for anybody who uses a modem (or who plans to start using one).

For example, **HomeTerm** programmer Russ Wetmore tells you how to get more power out of the inexpensive **1030 Modem**. There's a type-in terminal program with hot new features. Another type-in program makes it easy to create animated cartoons on a BBS or on your own home screen.

The latest TeleComputing products for Atari will be reviewed. And when you log onto ANTIC ONLINE, you can always expect to find the latest news and information about the Atari world—including the most recent developments for the 16-bit **ST** computers.

From most areas, there are no long distance charges when you log onto CompuServe, and there are never any charges for ANTIC ONLINE besides the standard hourly CompuServe connect fee.

ANTIC ONLINE Special Bulletins may be downloaded for reprinting in newsletters of user groups affiliated with the Worldwide Users Network. Officers of unaffiliated groups should write to the WUN coordinator at **Antic** for details.

help!

MANEUVER AND HEARTS

If you're finding blue hearts all over your **Maneuver** title screen (**Antic**, April, 1985) LIST the program to disk or cassette, type NEW, then re-ENTER it and SAVE it.

SG-10 FONT MAKER

Those with the new Gemini SG-10 printers may have discovered that **Font Maker** (**Antic**, March, 1985) will not work on these printers. Help is here.

First, set DIP switch 1–5 on your SG-10 to OFF and then type in the **Font Maker Modification** listing that you'll find in this month's Listing Section, page 59.

LIST the modification to disk, type NEW, LOAD the original **Font Maker** program, then ENTER the **Modification**. Finally, SAVE the entire modified program. (Those confused between LIST and SAVE should see "Why You Want DOS 2" in **Antic**, April, 1985.)

TYPO II UPDATES

Since **Antic** began using the new TYPO II proofreading program in January 1985, we have been getting requests for TYPO II codes to some of the most popular pre-1985 programs.

In this months' Listing Section, you'll find the line-by-line codes—just the codes—for "Biffdrop," "Escape from Epsilon," "Advent X-5," and "Adventure Island." We'll print additional TYPO II updates if we get enough requests. Enjoy.

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Antic's 520ST is demonstrated by Richard Frick (front right), Atari ST Software Development Director. That's Antic Contributing Editor Ken Harms at rear left.

John Scrutch, Atari XE Software Development Director at the microphone.

Photography by ERIK WEBER

Atari Engineering Vice President Tom Brightman answers questions.

Professor Joseph Lyons demonstrates the Virtuoso music generator, using Antic's 130XE computer to control four Casio CZ-101 synthesizers.

ANTIC ANNIVE

Atari world comes to Antic's party and

Some of the crowd at the Worldwide Users Network Inaugural Meeting.

Cutting the birthday cake for 250 guests is Antic Art Director Marni Tapscott.

From left: Ron Luks, Antic Online Editor; Sam Tramiel, President of Atari Corp.; Antic Publisher James Capparell; Sig Hartmann, President of AtariSoft division.

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Worldwide User Network start-up meeting

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DUCKS, SEAHORSES AND MUPPETS

New educational software

Reviewed by Anita Malnig

In **Big Bird's Funhouse** (CBS) the Sesame Street Muppets Bert and Ernie, Cookie Monster, Grover, Oscar, etc. are all hiding in a funhouse. The child must guess who's hiding where. Big Bird lets you know if you've guessed correctly. You must use a soft plastic overlay on the keys to indicate special squares for the child to push. This doesn't fit very well and tends to slide around.

At each of the five levels, the play is essentially the same. You hit some keys. A window in the funhouse will pop up and you see a Muppet character. Then you hit the hide key, the character disappears and you try to remember which characters are still around. Each character has his own musical theme which the child will come to recognize along with the character himself. (All the Muppets here are male.)

At the first two levels the empty open windows will be clues as to how many Muppets are missing. Later on all the windows are open and empty. Later still, you guess the order in which the characters appear. The animation and music when the Muppets are hiding is funny and lively but the graphics seemed a little fuzzy. So many educational programs are achieving superb quality in their graphics that one can't help but be somewhat disappointed by the slightly off-register resolution here.

But the graphics are less of a disappointment than the fact that this is essentially a skimpy, one-theme program. I think that even pre-school children would get tired of the repetitive gameplay rather quickly.

However, right on the money is **Ducks Ahoy!** published by CBS Software and developed by Joyce Hakansson Associates in Berkeley, California.

You're in Venice and in your gondola you must pick up ducks who want to go to the beach. You maneuver your boat through the canals and pick up ducks at the doorways of the various buildings. Then you take them up to the beach. But, you've got to avoid the hippo who upsets boats and get to the door of each building before the comically waddling ducks plop themselves into the water. The ducks don't quite know how to stop. You've got to have the boat waiting for them.

The graphics are crisp, the waddling ducks are very amusing and the music charmingly duplicates an Italian song, such as a gondolier might play!

The ducks do move in a pattern (after you play a while you begin to pick it up). You must determine how long it will take you to steer the boat to pick them up in time. You can pick up two in a row and take them both to the beach, but you must be sure you'll avoid the hippo. Ten ducks on the beach wins a game.

This simple, clever game can help young children with their fine motor coordination and counting skills. Older children can work on planning the most efficient routes and predicting the outcome of the game.

I've seen kids thoroughly involved with this game—and believe me, it can capture the parents' attention too! While this is also a one-theme program, it becomes an engaging adventure. Short, clear documentation accompanies the software, as well as a story book with duck jokes and activities such as making duck feet and duck lips! Lots of fun!

Also from Joyce Hakansson Associates for CBS is **Sea Horse Hide 'n' Seek**. Here you must maneuver your seahorse through a coral reef as it encounters old wrecks and seaweed. You also must guide it away from the lagoon fish who let out a special sound so you know they're coming.

This program teaches about some of the real properties of sea horses.

continued on next page

They use camouflage to hide. You steer your sea horse to a large piece of coral and it will assume the color of the coral.

Your goal is to get the sea horse home by crossing the reef. And it's quite an adventure to do so. A child playing this will have fun avoiding the lagoon fish, changing colors and hiding, and in the bargain learn something about underwater life.

Both Ducks Ahoy and Sea Horse Hide 'n' Seek are 16K cartridges, so they can be used on any Atari without a disk drive or cassette.

Muppet Learning Keys was produced by Jim Henson Assocates and Koala Technologies. This Keyboard is designed for use by young children who have difficulty mastering the standard computer keys.

On the Muppet Keys, letters are set out in a five-row square in their regular A-B-C- sequence. The numbers are arranged to look like a ruler. There are other keys— Stop, Go, Erase and Zap!—which all have funny cartoon markings and perform special functions.

With the use of an adapter disk you can run your other software for your child to play with via the Muppet Keys. But the special games for the keyboard now available on Apple and Commodore are not out for the Atari.

And when I tried to run other popular software on an 800XL with the Muppet Keyboard in place, the programs all crashed. I've spoken with people at Koala who assure me this is not supposed to happen. Be sure and try your child's favorite games with this keyboard at the store before you make a purchase.

BIG BIRD'S FUNHOUSE
$34.95, 48K disk, ages 3–6

DUCKS AHOY!
$12.95, 16K cartridge, ages 3–6

SEA HORSE HIDE 'N' SEEK
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CBS Software
1 Fawcett Place
Greenwich, CT 06836
(203) 622-2525

MUPPET LEARNING KEYS
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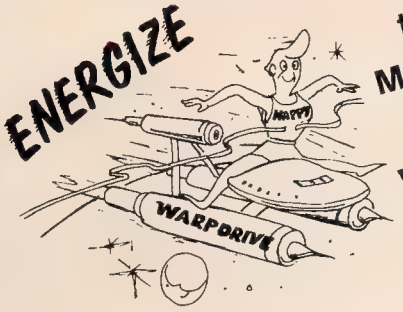

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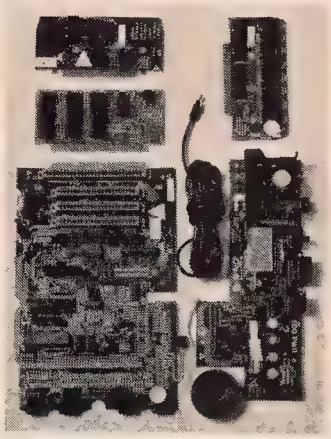

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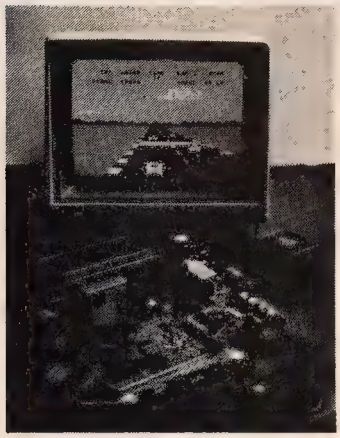

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SPARE PARTS FOR YOUR ATARI

eight new synapse games

synapse merges with Broderbund

by JACK POWELL,
Antic Technical Editor

Eight Synapse action games for Atari have just been released—six of them in 2-for-1 packages priced at $24.95 — marking the completed merger of Synapse Software and Broderbund Software.

Contracts for the purchase of Synapse by Broderbund were actually signed in October, 1984. But details of the agreement between two of the top independent producers of Atari software only now have become available.

Some months before the purchase, Synapse came into financial difficulties. They had an exclusive distribution agreement with Atari for the business application series **SynFile+**, **SynCalc** and **SynTrend**. After Jack Tramiel bought Atari, he took the position that the contract was not binding on the new owners. Synapse stopped getting payments and filed a lawsuit.

The owners of Synapse and Broderbund had been close friends since the early days of home computers. A merger between the two Northern California companies seemed natural. The possibility had been discussed even before the SynApplications disaster.

Some changes at Synapse were immediate. Jon Loveless, formerly vice president of marketing, became acting president, and Brian Lee was named director of product development. Synapse president Ihor Wolosenko became—and remains—creative consultant for the two companies.

PHASED MERGER

For six months, Synapse continued to operate as a separate entity while agreements were worked out on how to shape the merging companies.

Starting in January 1985, Broderbund took over all Synapse operations except for research and development of new products, which remains at the original Synapse facility in Richmond, California..

Jon Loveless turned down a position as director of sales at Broderbund and became president of a venture capital firm. Brian Lee—a familiar face at Atari users group meetings in the San Francisco Bay Area—became director of the Synapse Division of Broderbund.

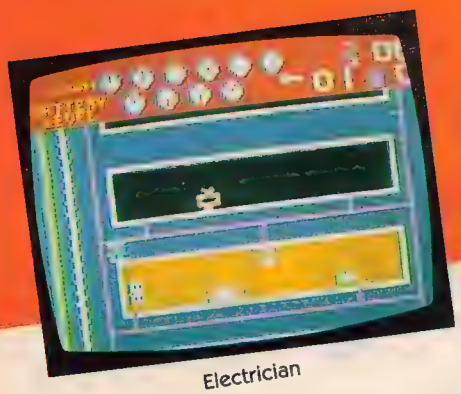
Broderbund says it is determined to retain the distinctive personality of the Synapse product line. It knows that Synapse is strong where Broderbund is weak and vice-versa. All Synapse products will retain the Synapse name and continue to be developed by Synapse programmers.

Customer service will continue with no interruption, according to both Synapse and Broderbund. The phone number on current Synapse packages remains valid. In fact, the only immediate noticeable change will be the addition of the Synapse line to the Broderbund catalog.

STRONGER NOW

What does all this mean for the future? Well, **Antic** is optimistic about the possibilities.

Broderbund has always developed



Electrician

Quasimodo

Alleycat

Apple products first, porting its programs over to the Atari later. Synapse is one of the best of the independent Atari software producers. Each company produces polished, highly distinctive software and it should be fascinating to watch how they influence one another.

For example, Synapse has spent many months developing a sophisticated parser for adventure games, which will be seen in the upcoming "Electronic Novels" series. (See "Coming Adventures", **Antic**, November 1984.) Now Broderbund will also be using this tool to produce all-text adventure games.

A more immediate boon is the *eight* new Synapse games for Atari which have just been released.

Six of the eight games are being released as "Double Plays" — which means you get two games for only $24.95. And these are not inferior games!

Only one of the Double Play games, **Rainbow Walker** is not brand new. (It was reviewed in the September 1984 **Antic**.) Two new games are being released as singles— **Blue Max 2001** (a lot of gamesters have been waiting for this one!) is $29.95 and **Alley Cat** is $19.95.

THE GAMES

Rainbow Walker is bundled with **Countdown**. Rainbow follows the colorful plight of Cedric as he jumps and leaves a rainbow puddle. Try to create a rainbow of colors as noxious critters undo your work.

Countdown lets you penetrate enemy missile silos and prevent the launch of a warhead aimed at your country's capital.

The noble successor to **Blue Max** is Blue Max 2001, which takes you into the future in a typical strafe-and-bomb aerial arcade game. Look for good graphics and a good challenge.

New York City is bundled with **Electrician**. Stuck in the Big Apple, you must successfully drive and walk between Central Park, City Hall, the Main Post Office and so on. Simply moving around is a challenge, and each station also contains an additional arcade puzzle.

Success in Electrician comes when you connect the wiring to each room in a building. This gives you a key to another building, located one maze away. You'll have to contend with spiders, bats, rats, alligators and other stock nasties.

The third double pack is **Quasimodo** and **Air Support**. Quasimodo puts you in the enviable role of the notorious hunchback as he defends his belfry from archers and bats.

Air Support gives you control of a helicopter in either an arcade or strategy game. You can set levels of troop strength, difficulty and so on.

Finally, there's Freddy the **Alley Cat**. In case you haven't lived in an alley before, there are dead fish to be collected in garbage cans, open windows to jump through, mad dogs and bad people to avoid. All this so Freddy can get to his sweetheart, Felicia.

130XE: HOW ATARI'S NEW 8-BIT DOES IT

XL compatibility plus 128K power

by JACK POWELL, **Antic** Technical Editor

Just before publication deadline, Atari released first specifications for their new 130XE computer. We wasted no time in passing along the most important points to technical-minded readers.—ANTIC ED.

The 130XE provides its owner with 128K of system RAM. Since it is an 8-bit machine and therefore incapable of addressing more than 64K of memory, the extra 64K is accessed through selective bank switching.

Atari states that any software developed for the 130XE which does not use the extra RAM will be 100% compatible with their new 64K 8-bit 65XE computer. And of course the 65XE is being billed as 100% compatible with the 800XL model it replaces.

The announced differences between the 130XE and the 65XE are:

1. RAM capacity and organization.

2. Altered usage of the 6520 PIA (Parallel Interface Adaptor).

3. Increased power supply requirements. (1.2 amps at 5 VDC for the 130XE).

4. Enhanced Cartridge Interface.

Figure 1

1. Compatibility mode:

VBE	CBE	BA1	BA0	CPU Access	Video Access
1	1	X	X	Main $4000-$7FFF	Main $4000-$7FFF

2. CPU Extended RAM mode:

VBE	CBE	BA1	BA0	CPU Access	Video Access
1	0	0	0	Exp $0000-$3FFF	Main $4000-$7FFF
1	0	0	1	Exp $4000-$7FFF	Main $4000-$7FFF
1	0	1	0	Exp $8000-$BFFF	Main $4000-$7FFF
1	0	1	1	Exp $C000-$FFFF	Main $4000-$7FFF

3. Video Extended RAM mode:

VBE	CBE	BA1	BA0	CPU Access	Video Access
0	1	0	0	Main $4000-$3FFF	Exp $0000-$3FFF
0	1	0	1	Main $4000-$7FFF	Exp $4000-$7FFF
0	1	1	0	Main $4000-$7FFF	Exp $8000-$BFFF
0	1	1	1	Main $4000-$7FFF	Exp $C000-$FFFF

4. Extended RAM mode:

VBE	CBE	BA1	BA0	CPU Access	Video Access
0	0	0	0	Exp $0000-$3FFF	Exp $0000-$3FFF
0	0	0	1	Exp $4000-$7FFF	Exp $4000-$7FFF
0	0	1	0	Exp $8000-$BFFF	Exp $8000-$BFFF
0	0	1	1	Exp $C000-$FFFF	Exp $C000-$7FFF

The "Enhanced Cartridge Interface" (ECI) is the new parallel bus which will only be available on the 130XE. It's designed as an extension to the cartridge slot and Atari claims it "provides equivalent architectural functionality" to the PBI on the XL line. Whether it provides *physical* equivalence and, if not, whether hardware manufacturers will want to make double plugs for compatible hardware remains to be seen.

See *Figure 2* for a chart of ECI signals. No pin numbers were available at press time.

TWO BANKS

The two 64K banks of memory in the 130XE are called the "main bank" and the "secondary bank." They are identical in layout and control capacity and may be accessed by either the 6502 or ANTIC microchips in various combinations, through manipulation of four previously unused flag bits in the 6520 PIA registers (beginning at $D300).

The first flag bit is the Video (ANTIC) Bank Enable which, when set to zero, enables video data fetches from the extended RAM. The second bit is the CPU Bank Enable. This allows CPU access of the secondary bank.

The secondary bank is approached through a 16K "access window" at locations $4000–$7FFF. At any one time, only one 16K "page" is accessible through this window. The final two new PIA bits are used to specify the chosen page address for the extra 64K bank.

These four bits, along with the ability of both the CPU as well as ANTIC to access the new RAM, provide some interesting combinations. There are four distinct modes of operation:

1. Compatibility mode.
2. CPU extended RAM.
3. Video extended RAM.
4. Extended RAM mode.

In CPU extended mode, only the CPU has access to the secondary bank, ANTIC sees the main bank. Keep in mind that any access to the extended RAM is only through the access window at $4000-$7FFF. In this mode, you could place your display lists and screen information in main memory and use extended RAM for program and data storage. No synchronization of bank addressing with display activity is required on the part of the programmer!

The Video extended RAM mode is essentially the reverse of the above. The secondary bank is accessed by ANTIC while it remains invisible to the CPU.

In Compatibility mode, both ANTIC and the CPU see the main bank. In Extended RAM mode, they both see the secondary bank. *Figure 1* shows how setting the PIA bits affects the CPU and ANTIC access for the various modes.

So what are you going to do with all this new stuff? A practical, applications-minded programmer could create quite a database program with this but as for me, I see an **Eastern Front** with an eight-way scrolling map that just won't quit!

Figure 2

ENHANCED CARTRIDGE INTERFACE CONNECTOR

	ECI Conn	Description

|	A0-A12	1st 13 Address Lines.
|	D0-D7	System data bus.
|	R/W*	Processor read/write.
|	PHI2	System clock.
present	+5V	DC power.
30 pin	GND	Ground.
cart	S4	Chip select $8000-9FFF.
conn	S5	Chip select $A000-BFFF.
|	RD4	ROM present.
|	RD5	ROM present.
|	CCTL	ROM bank control select.

|	A13-A15	Upper 3 Address Lines.
|	REF	Present cycle is a refresh.
|	MPD	Math pack disable.
|	RESET*	System reset.
14 pin	IRQ*	Interrupt request.
extension	AUDIO IN	External audio input.
|	I/O1*	Chip select at D1XX.
|	HALT*	ANTIC halt* signal.
|	Extsel	External memory assertion.
|	Reserved	Reserved signal line.
|	GND	Second ground.
-----	+5V	Second power.

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LETTER WRITER is a preformatted letter writing program. LETTER WRITER can be used for any number of applications involving entering, editing and printing text. LETTER WRITER is designed to be easy to use and does not require extensive training. While LETTER WRITER is not a full word processing system, it performs 90% of the functions used by harder to use and more expensive word processors. DESK SET also contains a program that allows you to combine Card File and Letter Writer for interaction.

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SMARTDOS $39.00

- SMARTDOS is 100% density smart. SMARTDOS will sense the density of each disk in use and automatically reconfigure the entire system to that density.
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- With SMARTDOS you may Copy with query, (eliminates specifying each item individually).
- Counter screens – which keeps the user informed as to what the system is doing and where in the task the system is.
- Disk testing for bad or unusual sectors that may be corrected.
- RESIDUP feature allows simple yet powerful full time availability of DUP.SYS commands while leaving your program intact and ready to RUN.
- Minimum keystrokes for maximum power, e.g. a disk directory is done by pressing only one key – the drive number (great for filesearches, and "=" may be used to replace *.*.
- The ability to run from 1 to 9 autorun files sequentially.
- Built in disk drive speed check.
- SMARTDOS is only 34 single density sectors long and works with all Atari computers with a minimum of 24K RAM.

FILING SYSTEM $19.00

FILING SYSTEM allows the user to configure any type of data file imaginable. Examples are recipe cards, mail lists, reminders for birthdays, check-ups, etc..., complete inventories (home and business), personnel files, customer call-ups, price list, and much, much more. You may retrieve data using any field or combination of fields. Files also may be saved, sorted, and printed in a preset format that you configure. Uses either a single or a double density disk drive. 24K minimum.

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This disk contains both LETTER WRITER and MASTER LIST plus the necessary program that allows for combining the two programs for interaction. Call a file off disk, type a letter and (with the right printer) type on envelope, or just run one letter after another. All of the powerful features of both LETTER WRITER and MASTER LIST plus the ability to use them together.

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CRYPTOQUOTES

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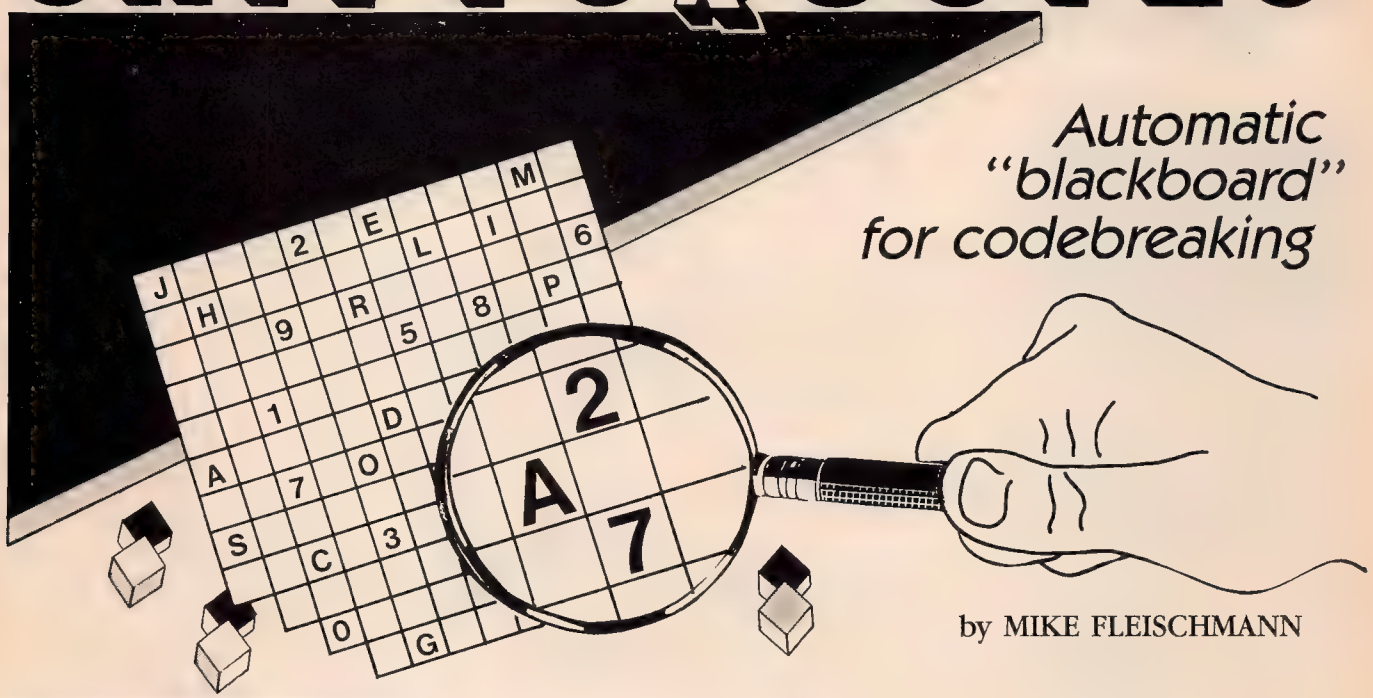

by MIKE FLEISCHMANN

Now your Atari can remove a lot of erasing and tedium from solving code puzzles. Every time you enter a substitute letter, you'll get a global replacement throughout the secret message. This BASIC program works on all Atari computers of any memory size, with disk or cassette.

I'm a cryptoquote fan. I love to work over these nonsense letter groups trying to find their hidden meaning. You find cryptoquote word puzzles in many newspapers. They are sayings that have had their letters substituted with other letters. Let's say the word "THAT" appears as WFRW; the W stands for T, F for H, and R for A. You try to break the code and find out what the puzzle really says.

Solving cryptoquotes requires trying lots of letter combinations, and this means using lots of paper—or using this program.

SOLVING PUZZLES

To solve these codes, you look for clues in the letter combinations and word groups. When you think you know what one word is, you write that word above its corresponding code letters. You then write those letters above their encoded counterparts throughout the rest of the cryptoquote.

If your word seemed to show that the letter W in the cryptoquote was really the letter T, you would search for every W and replace it with a T. This process then leads you to other clues, or to a conclusion that your guess was wrong.

USING THE PROGRAM

Type in Listing 1, Check it with TYPO II and SAVE a copy. It will function as an automatic blackboard, looking for the letters and erasing entries.

You'll be asked to type in the cryptoquote, which will be displayed in inverse letters. To enter a guess, type the letter you want to change, a space and the letter you want to replace it with. The program will place your guessed letter above the letter to be changed. To erase a guess, type the cryptogram letter corresponding to the guess you want erased.

If you like this program, here are some modification ideas that you might try to work out.

1. Check the input to see if the letter you want as a replacement has been already used.

2. Allow for input of entire letter groups at a time, instead of single letter input.

3. Have the punctuation copied automatically to the replacement line.

4. Speed up the program.

5. Make a game out of the puzzle by installing a counter—try to solve the cryptoquote in as few moves as possible. Have the computer calculate the minimum possible moves.

I'll say goodbye with a cryptogram:

WXXA KGZO! BRJ JXG ERDQ BRFJ ERUUJ EXGCN NXKDTFW YEQNQ UGLLKQN.—YEG RGYEXC

Hint: Y is a T. Good luck.

Mike Fleischmann is a professional programmer and digital design engineer from Sunset, Utah. His contributions to ***Antic*** *include our current listing printout program.*

Listing on page 59.

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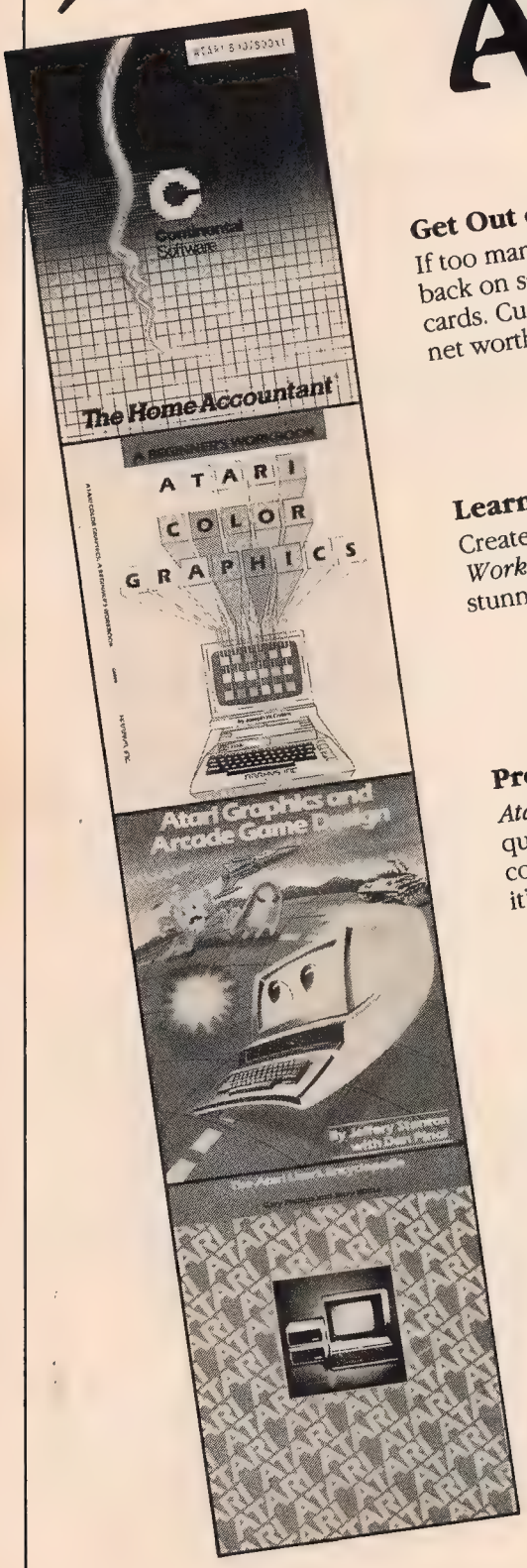

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STAR VENTURE

by RONALD SAARI

Newcomers to the Atari computer should find Star Venture a relatively easy game to type. This space opera is created with just a few redefined characters in Graphics Mode 0. It will run on all Atari computers of any memory size, with either disk or cassette.

"Kid, I've jockeyed rockets from one end of the galaxy to another, but I've never seen anything hairier than the Ghost Station of Antroni. . ." The Sarge's words echoed in my head as a huge metal gate clanged shut behind me!

Yes, I was now locked in the vast outer chamber of the legendary Ghost Station! Beyond my viewport floated rare and incredibly valuable Quontex crystals. All I had to do was fly over them to pick them up—while avoiding those lethal Kirollian Death Pods!

Yet I knew this was my last desperate chance to avoid spending the rest of my life toiling as a slave in the living mudslime of the Antronian glort fields. Shipwrecked in the Antroni star cluster after barely surviving a cataclysmic meteor storm, I needed to come up with plenty of cash for repairs and refueling—not to mention those outrageous Existence Taxes they charge on Antroni!

So I rubbed the sweat from my palms, gripped the control stick, and pushed gently forward. . .

GHOST STATION

Each chamber of the gargantuan abandoned space station was slightly different. Only some of them had barriers, but every chamber contained nine near-priceless Quontex capsules as well as too many death pods.

But until I collected every capsule from one chamber, the gate to the next remained forever locked. One brush against the walls, barriers or death pods and I'd be nothing but a handful of stardust!

As I carefully explored the station, I was surviving long enough to notice a pattern: After five chambers, it seemed as if I was starting all over again—except it was harder. A lot harder! Whatever long-forgetten alien race built this Ghost Station was crazy, not to mention sadistic as all get-out.

Luckily, I still had some shield energy left. I'd started with 15 shields, but you know sometimes you just can't avoid those killer pods. So you've got to press the old fire button and. . .BLAMMO. . .there goes another pod. Well, I still have enough left for three more shields. And there's gotta be a way out of here with my crystals!

Doesn't there?

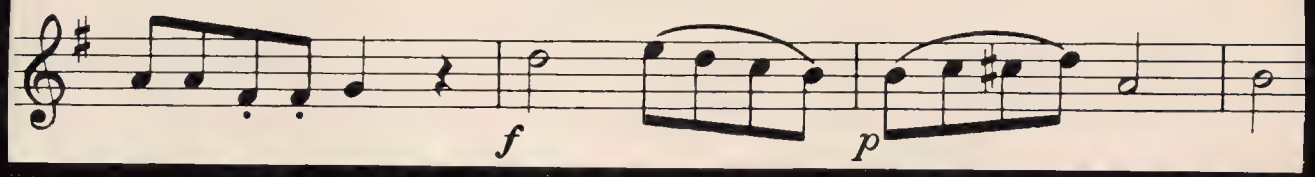
Ronald Saari would be happy to have you log onto his New Jersey Atari BBS, the Loony Bin, at (201) 449-3895.

Listing on page 63.

Guess that Song

How many notes do *you* bid?

by KARL E. WIEGERS



A musical quiz show emceed by your Atari. How many notes do you bid to ***Guess That Song****? This BASIC program runs on all Atari computers of any memory size, with disk or cassette.*

Now, in the privacy of your own home, you can experience the thrills and suspense of being a contestant on one of the classic television quiz shows. Just type in Listing 1, check it with TYPO II, SAVE a copy and get ready to play Guess That Song against your friends!

With this program, your Atari can perform the first ten notes of 40 songs—rock, classical, TV/movie themes, and general.

After entering the names of the contestants, each opponent bids to see who thinks they can identify the song from the fewest number of notes.

The bidding starts at 10 notes and ends when someone presses [P] to pass. Players alternate bidding and each bid must be lower than the previous one.

The computer will play the number of notes bid. You can press [R] for a repeat playing of the notes (don't press [RETURN]).

BIG CHANCE

Here's your big chance! Now is the time to guess the mystery song. When you think you have it, press [A] to see the correct answer. Then you must tell the computer if you identified the song correctly. Press [Y] if you got it right, or [N] if not. Use your judgement to determine how accurately a song's title must be stated to be considered correct.

If you won the bid and guessed the song correctly, your score will increase by 11—minus the number of notes in the bid.

For example, a song successfully identified from four notes gives that player seven points. The fewer the

notes, the more points awarded for a correct identification.

However, if the guessing player misses the song, then the score decreases by the number of notes in the bid. When prompted, press any key to go on to another song. The player who passed on the previous song gets the first chance to bid on the next one. Fifty points wins the game.

Correctly guessed songs won't reappear in the current game. A missed tune might pop up again later, though.

ADDING SONGS

You can replace any of the tunes in "Guess That Song!" with your own selections. You must construct a DATA to replace one already in the program, using the same line number. Lines 4000–4090 are the rock songs, 4100–4190 are classical, 4200–4290 are theme songs, and general songs live from 4300–4390.

The DATA statement for each song has five factors. First is the relative tempo (speed) at which the song is played. Smaller tempo numbers play faster.

Second factor is separation of the notes in the song. Increasing this number gives a more staccato character to the tune, as well as slowing it slightly. Third comes a string of 10 funny looking characters—which will be explained later.

Fourth is a string of 10 letters, which represent the relative duration that each note is to be played. For example, if the letter A represents an eighth note, then B represents a quarter note, D is a half note, and H a whole note. Finally, the title of the song completes the DATA statement.

Write down the notes in the song and their relative durations. Check *Table 1* and look up the keystrokes corresponding to that note. The pitch values for the SOUND command are also shown. The ten-character string in the third position of each DATA statement is the sequence of keystrokes you found in the table for the first 10 notes of your song.

TRYING NEW TUNES

To try out your new tune, replace one of the DATA statements in Guess That Song with the entries for your song. It will take some experimenting to get the song to sound right, so let's use a quick way to test the new selection. Add this line to the Guess That Song program:

```
2255 GRAPHICS 0:LN=????
: LIST LN: PRINT "GOTO
2255"
```

Replace the ???? with the line number you are using for your new song. Now type RUN, then press [SYSTEM RESET] without entering player names. Now type GOTO 2255.

The screen will clear, your new DATA line will be listed on the screen along with a GOTO 2255 line, and you'll hear the song. Disregard the error message which appears. To change any part of your DATA statement, edit the line shown using the cursor keys, and press [RETURN] twice.

Repeat this procedure for all your new songs until they are just right. Then, type 2255 and press [RETURN] to delete line 2255, and SAVE the modified program. SAVE it with a different filename than used for the original Guess That Song so you can keep both versions.

SAMPLE SONG

As an example, let's do "Red River Valley" in the key of F. The notes are: C F A A A A G A G F. *Table 1* tells us to type, in Inverse Video: s 6 [CTRL] P [CTRL] P [CTRL] P [CTRL] P " [CTRL] P " 6. The complete data statement might look like this:

```
4000 DATA 15,6,SGSSSSSPS
PG,AABAABAAAE,"Red Rive
r Valley"
```

PROGRAM TAKE-APART

50–80	Initializations
110–150	Call subroutines for main parts of program
160–220	Decide whether to continue, play again, or quit
800–820	Subroutine to make error sound
900	Subroutine to get a keypress
1000–1150	Subroutine to get player names
1500–1540	Subroutine to show players and scores, select next song, show category
2000–2120	Subroutine for bidding on number of notes
2200–2260	Play specified number of notes of current song
2270–2310	Let user play again or see the answer
2500–2550	Play the song
2800–2840	Let user indicate whether guess was correct
2850–2890	If correct: increase score, play all ten notes, set flag so song isn't played again this game
2900–2910	If wrong, decrease score
3000–3010	Get keypress and go on with game
3100	Subroutine to make sound when score goes up
3500–3680	Judge if there is a winner, play tune if yes
4000–4090	Data for rock songs
4100–4190	Data for classical songs
4200–4290	Data for theme songs
4300–4390	Data for general songs
5000	Data for song played when someone wins

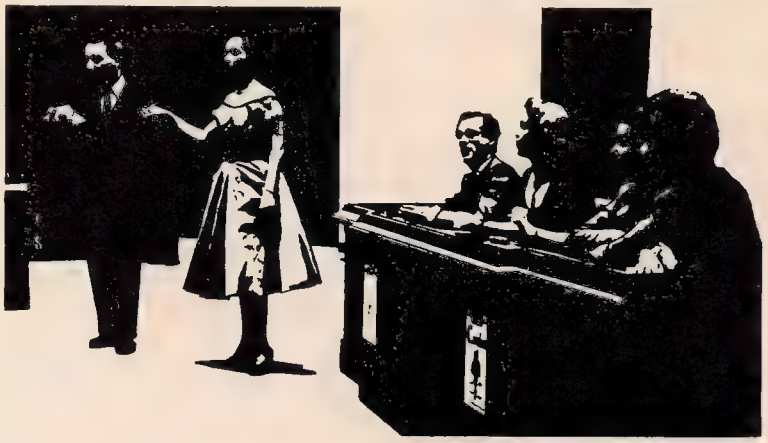
continued on next page

Table 1

Pitch Values and Keystrokes for Notes. ([INV] stands for Inverse Video key).

Note	Value	Keystroke	Note	Value	Keystroke	Note	Value	Keystroke
C	243	[INV] s	A#/Bb	68	D	F#/Gb	42	*
C#/Db	230	[INV] f	B	64	@	G	40	(
D	217	[INV] Y	C	60	<	G#/Ab	37	%
D#/Eb	204	[INV] L	C#/Db	57	9	A	35	#
E	193	[INV] A	D	53	5	A#/Bb	33	!
F	182	[INV] 6	D#/Eb	50	2	B	31	[ESC] [CTRL] *
F#/Gb	173	[INV] —	E	47	/	C	29	[ESC] [CTRL] =
G	162	[INV]"	F	45	—			
G#/Ab	153	[INV] [CTRL] Y						
A	144	[INV] [CTRL] P						
A#/Bb	136	[INV] [CTRL] H						
B	128	[INV] [CTRL] ,						
C	121	y						
C#/Db	114	r						
D	108	I						
D#/Eb	102	f						
E	96	[CTRL] .						
F	91	[						
F#/Gb	85	U						
G	81	Q						
G#/Ab	76	L						
A	72	H						

Listing on page 57.



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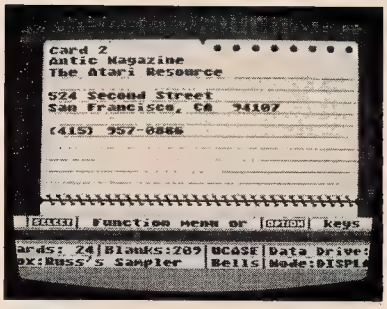

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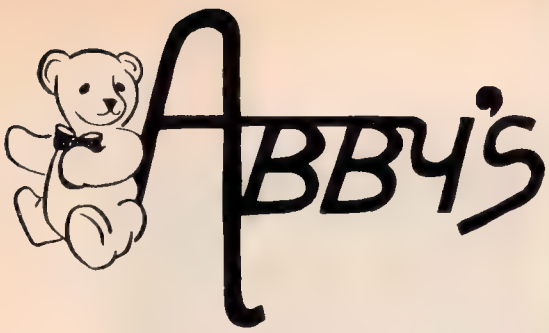

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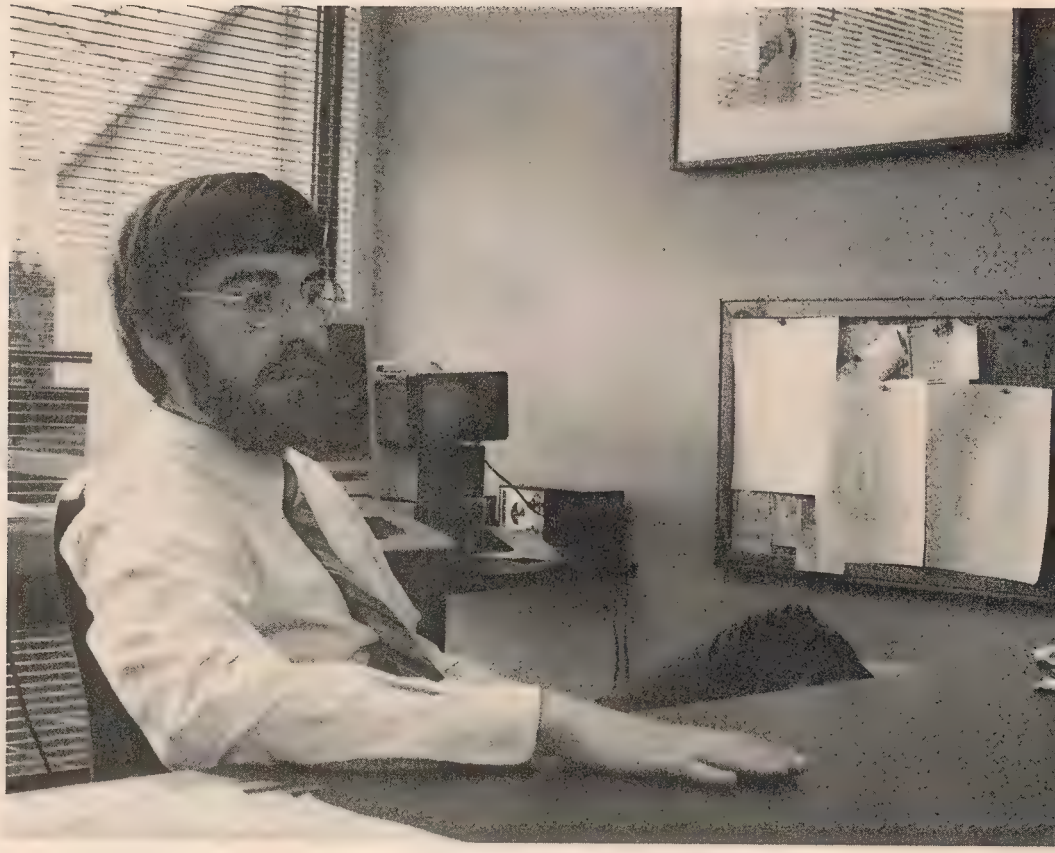
WAR GAMES

the story of S.S.I.

by JACK POWELL,
Antic Technical Editor



Photography Linda Tapscott

May 8, 1945, V-E Day. The war was over. Robert Billings returned from the Army to finish his education and received his Ph.D. in English, specializing in American war novels. His doctoral dissertation was about *The Naked and the Dead*.

While earning his living as an English professor, Billings pursued an interest in game design. He drilled holes in a piece of wood and drew a map of North Africa on it. He had screws and nuts and bolts that he would put in the holes, and you moved these pieces along and if you ran into another person's piece it would push through the other side and you knew you had combat.

He had this elaborate system where he used nails as infantrymen, and carved out little tanks, and used marbles with mirrors and you had to roll the marble down and knock over the opponent's nail.

He never published these games, but he played them with his son.

In 1965, Robert Billings brought home a board strategy game that was a little different, **Tactics II**, from Avalon Hill, the first commercial wargame. He showed it to his son and

"When you play a wargame, you realize you wouldn't want to be in war."

then taught him how to play. At the age of seven, Joel Billings was hooked.

STRATEGY ADDICT

"I was trapped for good. That was it." Joel Billings is now president of SSI, Strategic Simulations, Inc., considered by many to be the premier computer strategy game company. He looks remarkably like film director John Landis. "I played through the whole series of Avalon Hill wargames. I definitely was a heavy wargamer for a long time."

Joel's father eventually lost interest in wargames and and Joel lost an opponent. By the time he reached junior high, he discovered that wargamers were a minority. There was no one to play against. In desperation, he joined the school chess club, taught its members wargames, and started his own wargame club. "I had to create the opponents by getting them interested."

But Joel's family moved and when he started high school, he was back to square one. So he began playing by mail. At one point, he was playing nine games simultaneously in two different tournaments.

There was a company offering a service—almost like a dating service—where you paid $40 for a list of war gamers in your area. Joel paid. "Yeah, finding opponents was tough."

ECONOMETRICS & COMPUTERS

College came along and Joel found himself with little time for wargames. He was a math-econ major and into econometrics, mathematical modeling and forecasting. He was using computers a lot and began to realize they were perfect for wargames!

Computers could handle far greater detail than board games and eliminate most of the tedious paperwork. But most importantly, the computer was an opponent! 90% of board war gamers played solitaire, moving the troops on both sides of the board. A lot of people out there were looking for someone to play with.

Billings didn't know this at the time. He didn't even know home computers existed. He only knew he wanted to do wargames on computers and "Star Trek" was the only computer strategy game around. And it was on a mainframe.

SCHOOL OR BUSINESS?

In 1979, he was planning to go to business school, but all he really wanted to do was get into computer wargames. A friend had shown him a TRS-80, so he knew his idea could work. He tried to convince a programmer at IBM, but the man just wasn't a wargamer and didn't believe there were people out there who would buy these hard, complicated strategy games.

"SSI all started with an idea and it was touch and go for awhile as to whether I was going to go to business school or start this company."

Finally, Billings put questionnaires in local hobby shops for programmers interested in wargames. There were two responses: John Lyon and Ed Willeger. They were both programmers but, more importantly, they were *wargamers*.Around this time, a venture capitalist introduced Billings to Trip Hawkins, who is currently president of Electronic Arts. But back then, Hawkins was a marketing manager for Apple. He convinced Billings that Apple was going places. "We were very lucky that way or we could have gotten started doing TRS-80 games."

John Lyon was a wargamer into miniature figures. He had been a programmer since the '60s but had done nothing in BASIC and had never worked on a personal computer. Ed Williger was more of a wargamer than Lyon, but also had no experience in BASIC.

Lyon wrote SSI's first game, **Computer Bismarck**, and Willeger wrote the second, **Computer Ambush**. The first version of Computer Ambush for the Apple was incredibly

continued on next page

July's
Antic
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ALL 6 WINNING ILLUSTRATIONS
from the ANTIC cover coloring contest, as seen in the June, 1985 ANTIC issue.
(To view some of the micro-screens you'll need the software from KoalaPad or Atari Touch Tablet. Fun With Art software is required for one picture.)

slow. It could take three hours to process one turn! "It was just terrible." But it was one of their first products and they needed the money.

SILICON STRATEGISTS

Today, SSI has 60 games and sleek, modern offices in the Mountain View fringe of Silicon Valley. Serious computer wargamers consider it a company in a class by itself.

There are, perhaps, four categories of computer games: arcade, adventure, fantasy role-playing, and strategy-simulation. SSI seems to be a solid Number one in the fourth category. There may not be as many wargamers out there as arcade fans, but wargamers form a hard core of faithful consumers.

The typical elements of a wargame include statistics, a detailed combat map, statistics, charts, troop allocations, statistics, historical accuracy, and more statistics. SSI games are rated from introductory through advanced. Don't attempt an advanced SSI game if you're not a hardened combat veteran! The documentation alone will leave you gasping and bloody on the battlefield. Billings recommends **Eagles** or **Field of Fire** as excellent introductions to the genre.

WAR PAYS!

Most SSI games are written in BASIC then compiled for speed. Almost all their games are written by outside contributors. Of the 12 games published last year, six were by regular contibutors—such as the prolific and popular Gary Grigsby—but six were by complete newcomers.

"There's a decent amount of money to be made. A war game may bring in $10–20,000 for the programmer." Interestingly, Atari people are heavily into wargames. "Computer for computer, there's a higher percentage of Atari owners that play wargames than there are Apple or Commadore owners."

SSI has developed in-house graphics tools—Graph-Pak and Square-Pak—which speed map design and handle special algorithms, such as "line-of-sight checks", which programmers find tedious. Utilities such as these simplify transfer between computers and "allow us to crank these games out."

Billings referred to some of their games as "clone games." By keeping the core system and changing the weapons and the map, a new game is created. Gary Grigsby is their most prolific author partly because he's mastered their utility tools and the concept of clone games. "New math, new database, and you've got a whole new game."

WHO PLAYS?

Some may think wargamers are warmongers—right-wing hawks with a love of weapons and power. Billings says surveys show most wargamers are well educated and have a relatively high income. Not surprisingly, 99% of wargamers are male. Using one of his own games, **President Elect**, Billings rated himself, on a scale of 0-Conservative to 100-Liberal, as 60 overall. He was 83 on social views and 50 in foreign affairs. "When you play a wargame, you realize you wouldn't want to be in war."

But the fascination is there. We asked what turned him on: "Charts. Charts with weapons. A list of all your weapons, each tank—about 50 different tanks, and anti-tank guns, the range and the speed of the gun, and the maximum penetration."

Billings is particularly excited about a new SSI game called **Colonial Conquest**. It's a six-player game, where you play one of the major world powers during the period of your choice: 1880 or 1914. The powers are U.S., Japan, Russia, Germany, France, and England. You're out to control the world. Total global dominion. "It's fun to go out there and conquer the world on the screen."

RECOMMENDED READING

***Sorcerers & Soldiers**: Computer Wargames, Fantasies and Adventures,* by Brian Murphy. $9.95. 226 pages, paperbound. Creative Computing Press, 39 East Hanover Avenue, Morris Plains, NJ 07950. 1984.

bonus game

DARK STAR

by MICHAEL MITCHELL

Fly the Darkstar and wipe out enemy alien bases. There are two versions of this game, one is written in BASIC and the other is in ACTION!. Both will run on any Atari of all memory sizes, with either disk or cassette. But the ACTION! listing requires the ACTION! cartridge from Optimized Software Systems. Antic Disk subscribers will find a run-time file of the ACTION! version on their disk. Go to DOS and load DARKSTAR.EXE with the L function.

The year is 2001, you just graduated from high school and you're bored. All your friends headed for college or fulltime jobs, they seemed to have things planned out pretty well. You had dreams of medical school, but there was just no money for that kind of thing. So, what do you do?

You join the U.S.A.F.

IN LUCK

Things could be worse. It turns out you have a remarkable aptitude as a fighter pilot. But just as you soar to the top of your class, aliens from the planet Spectra land on Earth and begin installing military bases all over the planet.

Because of your stupendous flying abilities, you are selected to pilot the Air Force's new secret weapon: Darkstar. Your mission is to destroy as many enemy bases as possible.

FLIGHT INSTRUCTIONS

The controller on Darkstar is surprisingly primitive for a new secret weapon, and very similar to an antique Atari joystick. Just move the crude device in the direction you wish to fly the plane. The object is to pass your jet over as many of the enemy bases as possible, spraying them with your wake of radioactive wastes.

You're doing fine until you encounter one major problem: the controls have jammed. As a result, Darkstar continues to spray wastes nonstop, thus preventing you from crossing your own path. If you do touch the glowing contrail, your jet will be instantly damaged. Darkstar can withstand three blasts of radioactive waste. Upon the third blast, Darkstar will be terminated—as will you, the pilot!

NOT ENOUGH

As if you didn't have enough problems, some wimpy, kneejerk ecology group is up in arms just because your radioactive trail has permanently rendered uninhabitable a large number of small farms plus the entire state of Missouri.

Reacting to the pressure, the President interrupts his vacation and orders NASA to erect a deadly force field around your area of operation, effectively converting your flight into a kamikaze mission.

MERIT SYSTEM

But you're in this for the glory, and you will receive 30 merit points for each alien base destroyed.

However, you can keep obtaining new Darkstars at the end of each mission, simply by pressing the joystick button. If you somehow keep flying until all the aliens flee back to Spectra, maybe the scientists will figure out a way you can escape through the force field . . .

TYPING IT IN

Listing 1 is the ACTION! version of Darkstar and Listing 2 is the BASIC version. Although both games are similar in structure, they are not identical. The BASIC version has a simpler title screen, a different explosion routine and—more importantly—is much slower so your scores will probably be higher.

continued on next page

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If you have the ACTION! cartridge, type in Listing 1, SAVE it and then compile and RUN it. Those with BASIC should type in Listing 2 and check it with TYPO II. SAVE a copy before RUNning it.

ACTION! ANALYSIS

The source code is pretty well remarked and consists of only five procedures:

1. PROC WAIT( ) Pauses according to the CARDinal value passed within the parameter.

2. PROC TITLE( ) Prints the title, then rotates the screen colors.

3. PROC BOX( ) Randomly draws enemy bases.

4. PROC MAIN( ) The heart of the program. It sets graphics to mode seven, checks for collision, checks the joystick, and moves the player.

5. PROC START( ) Since MAIN( ) is called within itself, START( ) is used to isolate the initial TITLE( ) call.

Michael Mitchell is a San Francisco high school student who wrote the upcoming Antic Public Domain release ***Rainbow DOS*** *and is sysop of Twilight Zone BBS at (415) 755-0375.*

Listing on page 60

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SLIDE

The 24-puzzle: can YOU program a solution?

Program by MARK MOORE
Article by MICHAEL CIRAOLO, **Antic** Associate Editor

A computerized version of the 24-tile puzzle grid, Slide is easy to type in and a good starter for advanced programmers who want to try their hands at intelligent game design. Written in BASIC, Slide requires a joystick and 16K RAM on any Atari, disk or cassette.

Tile puzzles—grids of 8 tiles in a 3 x 3 arrangement or 24 tiles in a 5 x 5 arrangement—have been around a long time. Can you solve the 24 Puzzle? Can your Atari solve it? For an introduction to the design of intelligent games, read on. You'll find a jumping-off point for further programming and research. (Also be sure to read the article about Computer Chess in this issue.)

If you only want to play the game, type in Listing 1, check it with TYPO II, and SAVE a copy. Use the joystick to move the cursor in the desired direction. Move the lettered tiles by pressing the joystick button. You can move a tile into any vacant square.

When you get the tiles in alphabetic order, press the [SPACE] bar. The computer will verify your result—the time it took to complete the puzzle, or an obnoxious razz signifying that you need to try again.

INTELLIGENT GAMES

There are two types of "intelligence" you could use to set your Atari solving the 24 Puzzle. You could use an algorithm, which is a logical set of steps for solving a specific problem (or showing if no solution is possible). Since the program would have to examine every possible move until the best solution was discovered, this would be very slow and possibly beyond the limits of a computer's memory.

The alternative is devising a heuristic problem solving technique. This means developing a set of rules that cut out a lot of the false moves. Most electronic games favor heuristics since they require less moves, which makes them faster and more memory-efficient than algorithms.

If you are going to write a program to solve the 24 Puzzle, you might wish to use a common heuristic device called a "tree."

The game's starting position is called the "root." Spreading up from the root are all the legal moves, produced by a subroutine called a legal move generator. Each legal move, in turn, begets another generation of possible moves. It is up to the computer to evaluate each end position to see if that position is near a solution.

Intelligent game programs use a device called an evaluation function to supply a numerical score for each end position. Such a function for the 24 Puzzle might count the number of vertical and horizontal tiles between the current position and the target position. For instance, the "A" tile might be three spaces away from the upper left corner. Add this to the "B" tile's distance of five from its target position. Add this sum to the position for the "C" tile, and so on.

The score resulting from the evaluation function tells the computer which branches are closer to a solution; the program can then disregard the least promising result with a process called "pruning."

SOLUTION STRATEGY

Now we have a strategy:

1. The program will generate all possible moves from the root.

2. It will then evaluate each position to see how close a position is to the target.

3. Next, it will draw a new tree, based on the most promising results of the previous tree.

Each time the program draws a new tree, or picks the best possible position from a choice of branches, it is determining its next move.

In the world of electronic gaming,

continued on page 50

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Linda Tapscott

"You don't seem to be playing your usual game today, Dave."
—HAL 9000, from ***2001***

Computer CHESS Programming

by MICHAEL CIRAOLO, **Antic** Associate Editor

Computers that play chess have fascinated both the public and programmers ever since a large IBM 704 played two legal but bumbling games at a 1957 Dartmouth Conference on Artificial Intelligence. (For more about designing intelligent games, see "Slide" in this issue.)

In this article, we examine the current state of computer chess programming—as represented by the **Odesta Chess** software for Atari (Odesta Corp., $69.95) and the **Turbostar 432**, an expert-level dedicated chess computer (SciSys, $350) which uses the same 6502 microchip as the Atari.

During our research, we discovered that Atari computers play a more than passable game of chess. We matched the Odesta program against the Turbostar at levels ranging from easiest to hardest. The more expensive Turbostar consistently won, but the Odesta gave it a tough battle each time. And both play chess well beyond the skill of most non-competition human players.

PLAYING GAMES

The basic approach to designing intelligent computer games is not hard to understand, although the programming itself isn't easy. So says Larry

continued on next page

Atkin, who programmed Odesta Chess and helped write the groundbreaking CHESS program at Northwestern University. Successive versions of CHESS held the Computer Chess Championship throughout the 1970s.

Atkin said that most chess programs represent variations of a "tree" search pattern.

The computer "sees" the board as an 8 x 8 array of numbers, with the pieces represented as a positive or negative number.

Move selection involves three modules—a move generator, an evaluation function and a quiescence function.

The first module produces a look-ahead tree of possible moves starting from a given position and lists all situations that could possibly "branch" from a move.

CHESS MODULES

The program then develops a second generation of possible branches, and so on. Obviously, with millions of possible chessboard situations, even a Cray XMP supercomputer would run out of processing space quickly. That's why game design requires additional modules.

The second module is called the evaluation function. It is here that knowledge of chess strategy and concepts is put into an algorithm—a series of steps by which a computer can solve a given problem.

An evaluation function program might compare the two opponents' material forces, mobility, pawn strength, king safety, control of central squares, and so on. This function looks at each "node" (possibility) on the tree to analyse specific board positions.

The more chess sophistication you put into the evaluation function, the more processing time the program takes. So there is a trade-off between the number of nodes that can be examined and the complexity of the evaluation module.

Because most of the nodes on a tree aren't optimum positions, the program also needs a section to evaluate the end position of the various branches and determine what branches are worth pursuing. This module is the quiescence function—it "prunes branches" (eliminates possible moves) that aren't promising, thus freeing computer memory.

This complex process results in the computer making a move, and then developing a strategy for the situation created by the move.

Most dedicated machines currently use the same chip as the Atari, the 6502 microprocessor. Software is compiled into assembly language from C or Pascal. "C keeps you closer to assembly language, Pascal protects you from too many of assembly language's tricks," said Julio Kaplan, president of Heuristic Software in Berkeley, California. Kaplan programmed the Turbostar for SciSys.

NEW APPROACH

Although "brute force" is the proven approach to programming chess and other games, the philosophy is changing, according to Kaplan. He favors a "selective search" instead.

"You rely on special knowledge for evaluating each node," Kaplan said. That is, the computer starts playing more like a grandmaster and less like a computer. The search is narrower, but the "thinking" about various positions is more intensive.

Kaplan brings considerable "special knowledge" to chess programming—the last time he checked, he was ranked "about 73rd in the world." He was World Junior Chess Champion as well as a National Master. Active as a professional chess player for five years, Kaplan also holds a master's degree from U.C. Berkeley in computer science.

MOVING UP

Chess computer advances are coming quickly in both hardware and software, believes Kaplan.

There was a quantum leap between the previous SciSys Superstar machine and the current Turbostar, Kaplan contends. The Turbostar is much faster.

Kaplan said there's been considerable improvement in designing efficient search trees, with improved pruning. "It's a leaner program," Kaplan said.

Kaplan has improved the end game, an area traditionally weak in machine play because the consequences of any move went beyond the ability of the search tree, and those consequences are greater in the end game than in the opening.

To improve a chess program, you evaluate the game the program is playing. Kaplan thinks about what pieces of knowledge are missing for the computer's evaluation of a certain situation node.

That information then must be expressed in an algorithm. But that algorithm can't just be added onto the program. Kaplan must understand how all the elements of the program affect each other.

Finally, he must analyse the impact of the added algorithm on the speed

of the program, which is frequently measured in nodes per second—how many situations can the program evaluate in one second.

THE FUTURE

With the dropping price of ROM (Read Only Memory) chips which store the game program, larger programs for the high-end machines will be available at lower prices, Kaplan predicted. In the $60–80 range, machines are much smarter than they were three years ago.

The software area is especially improvable, Kaplan believes. Of the four leading companies, two are using brute force exhaustive search—ideal for finding tactical mates in, say, four moves.

The other companies, including SciSys, are using selective searches, which play some positions very well, but still make embarassing moves on others.

"I think there will be a master-level microcomputer based chess program within two years," Kaplan predicted.

"I'd like to see these machines provide entertainment, user interest and education." Ideally, the machine should tell you more about its own thought process and coach you on your game. Playing a computer chess program will be like playing HAL in *2001*—it can tell you when your game is off. . .and why.

"A brute force machine can't explain its thought process. Only a selective search can. This makes it more interesting as a chess player," Kaplan said.

The better micro programs currently beat the mediocre mainframe programs, Kaplan said. The day is not far when there will be "upsets" between micros and mainframes—by the end of 1986.

The next generation of Turbostar, which should be available by the end of this year, will have a tactical knowledge that surpasses the ability the brute force programs are likely to have by year's end. And new machines will be upgradeable with plug-in chips!

RECOMMENDED READING

Computer Gamesmanship, by David Levy. $12.95. 272 pages, paperbound. 1983. Simon and Schuster.

Chess Skill in Man and Machine, by Peter Frey. $18.95. 335 pages, 1984. Springer Verlag.

How to Get the Most from Your Chess Computer, by Julio Kaplan. $9.95. 1983. RHM.

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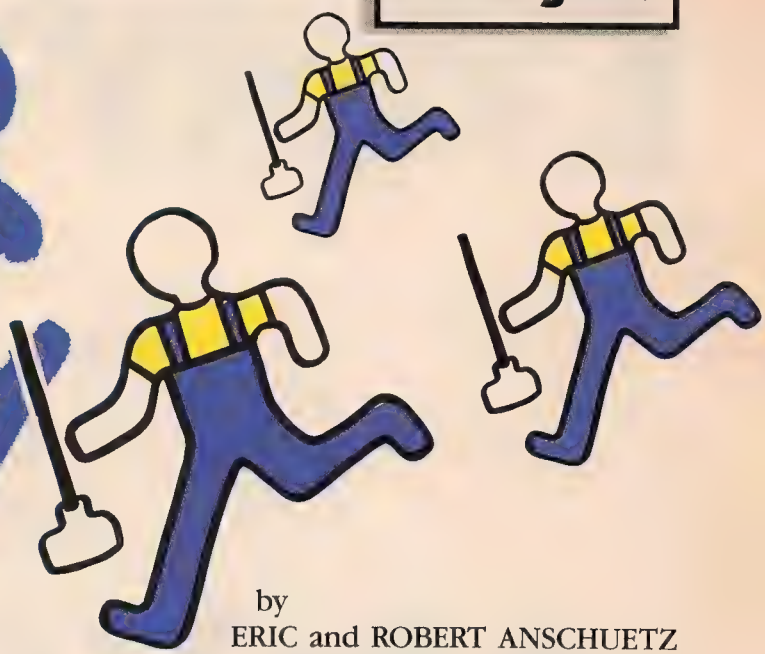
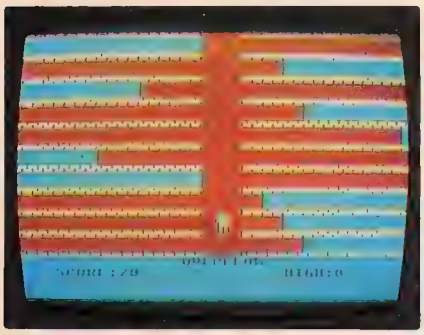


Only your plumber's helper can save you!

by
ERIC and ROBERT ANSCHUETZ
and JOHN WEISGERBER



Discover the thrills and excitement of being a Sanitary Engineer (plumber) as you enter a maze of killer pipes. This BASIC program works on all Atari computers of any memory size, with disk or cassette. Just type in Listing 1, check it with TYPO II and SAVE a copy before you RUN.

Dear Miss Goodmanners:

Is there a correct way to stem a rising tide of bathroom back-ups while entertaining distinguished guests in my 49-room mansion?

Concerned

Dear Concerned:

Miss Goodmanners prefers the term water closet . . . Sadly, overflow problems are part of our modern age and must be dealt with firmly and quickly. Miss Goodmanners would never commit the faux pas of embarassing guests during a sumptuous banquet by confronting them with a mass of raw sewage.

Miss Goodmanners would award you credit for decisively hurling your plumber's helper at each of the overflowing water closets, while tactfully running between pipelines without scaring the guests. Of course, sewage problems tend to get worse as a party wears on—especially if guests discover that the duck pate has disagreed with them.

With apologies to our favorite etiquette columnist, this program uses players for the plumber, plunger and central pipe. All vertical motion is produced using a string printed at the correct place in memory. The main graphics mode is ANTIC 5.

An unusual technique here is the use of basically the same memory address for every line of the playfield graphics. Each line has its own LMS and the high byte on every one is set to the same page. The water is moved back and forth by incrementing the low byte on each LMS. The increment for each line is held in a one-dimensional array. If a column of sewage is hit by the plunger, the increment's sign is simply reversed.

Members of the noted ***Antic*** *game programming team of Anschuetz, Anschuetz, and Weisgerber tell us that they are currently attending Eastern Michigan University and would like jobs as programmers when they graduate.*

Listing on page 62

EVERYTHING YOU WANTED TO KNOW ABOUT EVERY D.O.S.

Including the brand-new DOS 2.5

by ERIC CLAUSEN

Why in the world are there so many versions of DOS (Disk Operating Systems)? Flip through your favorite Atari magazine (**Antic**, of course) and you see ads and reviews for products with names that end in DOS. Who uses them, and why? The following will answer key questions and point out some of the good and not-so-good points of the major Disk Operating Systems available for the Atari computer.

For those of you who are new to the Atari, DOS 2.0S has been the most widely used DOS since its introduction in 1980. It is a good, reliable product. But the reason it is widely used is not so much because it is superior but because it is the "official" Atari DOS and was the first major DOS released for the Atari line of computers. Most major Atari software vendors conformed to it, so it became the "standard" by default, independent of merit.

If you wish an introduction to Atari DOS 2.0 and some of its functions, please refer to "Why You Want DOS 2" (**Antic**, April 1985). For those experienced in DOS 2.0, and yearning to explore greener pastures, read on.

ATARI DOS 2.5

This long awaited product, successor to Atari 2.0, will become the new 'official' Atari DOS. It was written by the same group of people (headed by Bill Wilkinson of Optimized Systems Software) who are responsible for Atari BASIC, DOS 2.0, BASIC A+, BASIC XL, DOS XL, ACTION! and other top-ranked Atari products.

DOS 2.5 supports both single density and the enhanced (dual) density mode on the Atari 1050 disk drive. If you format a disk in your 1050 drive with this DOS, you'll find that you now have 1010 sectors (129K) of available disk storage. This represents

a 43% increase in capacity over DOS 2.0. DOS 2.5 maintains the use of 128 byte sectors but increases the number of sectors per track from 18 to 26.

Most importantly, DOS 2.5 maintains file compatibility with DOS 2.0. Thus if you have a 1050 drive, you can boot up DOS 2.5, format a disk, directly copy your DOS 2.0 files onto the disk and have considerably more room left over. All this with no hardware modifications to the disk drive.

Otherwise, this new DOS looks and acts exactly like DOS 2.0. The menu will be reassuringly familiar as there has been only one addition: Option [P] on the DOS 2.5 menu will allow 1050 disk drive users to force a single density disk format instead of the default enhanced density.

Those of you with 810 drives need not despair, this DOS is for you too. Although you will not be able to use the enhanced density feature, you can boot DOS 2.5 disks that were formatted and written in single density on 1050 drives. The way that DOS 2.5 handles this is to "hide" files from the 810 drive that cross over sector 720, which is normally the last DOS 2.0 sector. If you completely fill a DOS 2.5 disk (1010 sectors) on a 1050 and then check the disk directory at some point you will see files listed like this:

```
 FILE1.BAS      025
<FILE2.BAS>     025
```

This tells you FILE1.BAS is entirely contained within the first 720 disk sectors and can therefore be accessed by an 810 drive. The file(s) with the "< >" characters around them are NOT accessible with an 810 drive because they are physically located where the 810 drive can't read them. So if you have an 810 and ask your friend with a 1050 to copy some of his files, make sure the files you want don't have < > around them!

Other features of DOS 2.5 are:

1. Though the directory of an empty formatted disk will read "999+ FREE SECTORS". You really have 1010 sectors.

2. Option J (Duplicate Disk) now formats the destination disk before copying.

3. DOS 2.5 will allow 64K of memory in the new 128K Atari 130XE computer to be used as a ramdisk.

4. A file conversion utility to convert Atari DOS 3.0 files to the DOS 2.5 format.

5. A utility to create autoboot basic programs.

6. An un-erase capability to retrieve accidently erased files.

7. You can easily turn write verify on or off and change the number of disk buffers, without resorting to POKEs.

8. The ability to test for bad sectors—whole disk only.

Options 3 through 8 are not directly accessed through the menu but are included on the DOS 2.5 disk as binary load files.

One thing that concerns me, as a user, is the lack of a disk utility program for enhanced density disks. In some preliminary checks, I've found that DiskWiz 2 will read all enhanced density sectors out to sector 1023 (the difference between 1023 and 1010 is taken up by the boot and directory sectors where program data is not stored). It won't trace or map sectors that run past sector 720, however.

I hope some company or individual will soon produce a full-featured disk utility compatible with this highly impressive new DOS 2.5.

ATARI DOS 3.0

DOS 3.0 is the DOS Atari has been shipping with the 1050 disk drive. It supports enhanced density but, unfortunately, will not read DOS 2.0 files directly and vice versa. DOS 3.0 permits conversion from DOS 2.0 files to DOS 3.0 format, but disastrously no provision was made to go the other direction.

Once you converted your DOS 2.0 files to DOS 3.0, you'd never be able to share your programs with an 810 drive owner. **Antic** published a method to convert back to DOS 2 (January 1985) and there are some public domain utilities around. Check your local users group, Compuserve SIG*Atari, or wait for DOS 2.5.

The DOS 3.0 file management is a more serious flaw. It stores files in "blocks" of 1024 bytes as opposed to the DOS 2 (and compatibles') 128 byte "sectors." This can be wastefully inefficient. If you save a file of 1025 bytes (one block plus one byte), DOS 3 will save it as 2 blocks, wasting 1023 bytes of disk space!

This product should be avoided. It's a shame so many newer Atari users have been saddled with it.

DOS XL 2.3

DOS XL is a superb product, written and marketed by Optimized Systems Software (OSS). Though no one DOS is ideal for the needs of all users, this product comes close.

DOS XL is shipped with both single and double density versions on the disk. It directly supports both single and TRUE double density.

DOS XL includes some features which make it truly unique

True double density utilizes 256 byte sectors as opposed to the 128 byte sectors of single density, with the number of sectors and tracks remaining the same. Therefore, the storage capacity of a double density disk is 256*18*40 bytes or 184,320 bytes, which exceeds the capacity of the enhanced density mode of the 1050 drive by more than 50,000 bytes—a substantial difference by anyone's standards.

Of course, you must have a disk drive capable of double density to take advantage of this increase, and to date no Atari-manufactured drive has had true double density capability. Owners of other drives such as Rana, Indus, Trak, Percom and Astra already enjoy the benefits of this extra storage.

Atari 1050 owners will find available at least two hardware upgrades to true double density. They are manufactured by Happy Computers, Inc. of Morgan Hill, Ca. and by ICD, Inc. of Rockford, Ill. These modifications take advantage of special DOS's which we'll look at in a bit.

continued on next page

DOS XL includes some features which make it truly unique. Three versions of DOS XL are included on the master disk. Each supports different memory configurations possible on Atari computers in order to maximize free memory for programming purposes.

As shipped, DOS XL is configured for use on any Atari with Atari or OSS BASIC. Another version of DOS XL on the disk is intended for use in conjunction with the bank selected OSS SuperCartridges (BASIC XL, ACTION! and Mac/65). This allows the DOS to occupy the RAM "under" the SuperCartridge, effectively increasing the amount of free RAM by 4608 bytes in a 48K Atari 800. Owners of 800XLs can utilize yet another version of DOS XL which takes advantage of the extra RAM available on the XL machines under the OS.

DOS XL can be either menu driven, like Atari DOS 2, or command driven like Apple DOS, CP/M and UNIX. People with a wide variety of computing backgrounds can therefore feel comfortable almost immediately with this product.

A menu driven system provides prompts and doesn't require that the user memorize numerous DOS commands. A command driven system is far faster once the user has mastered the commands. Also, the command mode occupies about 2K less memory since a menu doesn't have to be loaded into memory.

DOS XL supports numerous "intrinsic" and "extrinsic" commands. Intrinsic commands are those which can be issued in the command mode and do not require disk access (they reside in memory). Examples include: disk directory, change default drive number, protect and unprotect files, process batch file, run cartridge, erase file, etc.

Extrinsic commands are commands whose code resides on the disk, not in RAM. Examples include: copy, initialize disk, menu, etc. Actually, *any* binary load file, with the .COM (command) extender, can be a DOS XL extrinsic command.

Many long-time users of Atari DOS find the use of extrinsic commands irritating because they are not used to the requirement of having the various extrinsic command files present on the disk along with the DOS itself. A simple solution is to make a copy of DOS XL including only the files for extrinsic commands used most often.

Another complaint expressed is that all these extra files eat up too much disk space. There are three ways around this problem: Include *only* the files you need on your working DOS disk, use 2 disk drives (This allows you to get by with no DOS files on your disk, assuming you have a master disk in one of the drives), or get a true double density drive and increase your available space.

DOS XL also supports "batch processing". This allows you to put together a special text file made up of valid DOS commands and file names, then have those commands run in sequence by giving only one command.

Documentation for DOS XL is extensive

Batch files differ from extrinsic commands in that they contain only text and have their own special extender, .EXC (execute). Extrinsic commands and other files called by the batch file must be present on the disk for proper execution. In a special case, much like the familiar AUTORUN.SYS file, a batch file with the name "STARTUP.EXC" will execute when the disk is booted. This allows the user to autorun BASIC programs, something not easily done with Atari DOS 2.0.

OSS also has available special versions of DOS XL which directly support the Axlon Ramdisk, the Mosaic 64 board, and the Bit-3 80 column board. This makes it possible to program BASIC XL, ACTION!, and MAC/65 in an 80 column format.

The Axlon Ramdisk version of DOS XL automatically recognizes the Ramdisk, formats it (with 883 free sectors) and defines it as drive 4. This is the easiest, most efficient utilization of the Ramdisk I have seen. Most DOS's require special additional hardware to utilize a Ramdisk, such as the Omnimon or the Integrator Board. I'm surprised Axlon and Mosaic haven't licensed DOS XL from OSS and distributed it with their hardware.

Documentation for DOS XL is extensive and well written, and customer support is excellent. Additionally, OSS has begun including BUG/65, an assembly language debugger, with DOS XL.

DOS XL is a well thought out, highly professional product worthy of your attention.

SMARTDOS 8.1D

SmartDos by Astra Systems is the DOS that Astra has been packaging for some time with its own drives. Even though it is packaged with Astra drives, it is compatible with all Atari drives and all Atari DOS 2 compatible DOS's.

This is menu driven DOS with some notable differences from Atari DOS 2. It supports single and double density and displays a "status" line above the menu indicating which drives are active, their density and the size of free memory.

SmartDos has some useful menu additions that allow sector copying, drive speed checking, bad sector testing, write verify on/off, and drive reconfiguration (single to double density and vice versa). You're given the option of having DUP.SYS (the Disk Utility Package) resident in memory, though this uses considerable memory.

If you've ever needed a double density sector copier, now you've got one. SmartDos will copy 121 double density sectors per pass on a 48K machine, so several swaps are necessary to copy an entire disk (with one drive).

Like Atari DOS 2, there are no extrinsic commands to keep in mind. SmartDos does not require any special hardware and does not directly support any. It seems to have difficulty working with an Axlon Ramdisk, even with Omnimon installed. But this will be a minor concern to most users.

In general, this is an easy to use product, with more than just the basics.

SPARTADOS 1.1

SpartaDos is more of a specialty product than those previously men-

tioned. It is specifically designed to be used in conjunction with a hardware modification for the 1050 drive called the ICD Doubler. This modification is one of two which will convert the 1050 to true double density.

In addition to supporting double density, SpartaDos, with the ICD Doubler, supports ultra-fast disk I/O. Incidentally, Happy 1050's also support SpartaDos's ultra fast disk I/O. Not surprisingly, SpartaDos and the ICD Doubler are marketed by the same company, ICD, Inc. of Rockford Ill.

The other "specialty" use for this product lies in its ability to operate with various drive formats simultaneously. This should be of interest to ATR8000 owners who are running mixed 5 1/4" and 8" drives, single or double sided, single or double density.

SpartaDos is a command driven DOS featuring intrinsic and extrinsic commands and batch processing. It also features time and date stamping of disk files and multiple subdirectories with 128 file names per directory (double the usual number). There is an 'unerase' command, which allows you to recover a previously deleted file—if you haven't writen to the disk since deleting that file.

All of these features sound great, and they are—if you have the hardware. If you don't have a modified 1050 drive or an ATR8000, you may find few actual advantages to this product.

SpartaDos is not directly compatible with disk files created with any other DOS for the Atari. However, a file copy utility is included which will convert from DOS 2 type files to SpartaDos and back again. This utility will also copy between densities with ease. The only DOS with which this utility currently will not work is Atari DOS 3. SpartaDos is an intelligent copy utility which does not have to told in advance what file type or density it is copying to or from.

There are four versions of SpartaDos included on the master disk, two standard DOS's, one for normal drives and one for hardware modified drives, and two "read only" versions for normal or modified drives.

The idea of a read only DOS is a bit unusual, as most of us sooner or later actually need to save something onto disk and "read only" means just that, it will read files but not write them. The option is provided because it takes up less memory, loads faster, and is ideal for loading games where writing to disk is not important. The standard version supports all of the SpartaDos features.

The high speed versions of SpartaDos, when used with the appropriate hardware, provide extremely fast disk I/O. An improvement in reading and writing speed of 2 to 4 times over Atari DOS 2. SpartaDos is comparable to Happy Enhancement WarpDos in speed. This increase in disk I/O is made possible by the additional disk hardware which, among other things, increases the data transfer rate on the serial bus between the drive and the computer from 19.2k bps to over 40k bps.

All of these features sound great, and they are—if you have the hardware

Tremendous flexibility is provided for ATR8000 owners who may be using different types of generic disk drives. Special drive formatting is provided under SpartaDos with choices of 35, 40, 77 and 80 tracks, single or double sided, and single or double density. Additionally, a special RS232 handler is provided for use specifically with the ATR8000.

Multiple subdirectory capability is another unusual feature of this product. If, for example, you have a large number of game files which need some organization, you would do the following: When SpartaDos asks you for the "volume" enter GAMES. Create two subdirectories, call one BASIC GAMES and the other BINARY GAMES. Under each of these two subdirectories, create two more subdirectories called ARCADE and EDUCATIONAL.

You now have a single disk on which you can store, under the appropriate catagories, basic arcade games, basic educational games, binary load arcade games and binary load educational games. All the directories are linked and each directory can contain up to 128 subdirectories or file names, and so on.

This is only useful to people who have large capacity drives since all the programs that fit under the subdirectories that you create eat up disk space rapidly. Ideally, a large capacity hard disk would be what you want to take advantage of this capability—if one were available.

SpartaDos is not without its problems. Error handling could be improved. If you call a non-existent cartridge you get a system crash. If you attempt to format a write protected disk, the drive keeps spinning until you turn it off. And you won't get an error message if you tell SpartaDos to format your 1050 like an 8" drive.

Many of my binary files would not run under any of the four versions of SpartaDos. This did not seem to be due to errors in the file conversion utility, as I was able to reconvert the files to DOS 2 and run them. I did not have any trouble running basic programs under SpartaDos. There must be some memory conflicts with this DOS and some machine language programs.

Another small complaint: The disk directory lists the individual file lengths in bytes, and free disk space in sectors. So keep your calculator handy.

SpartaDos cannot be used with the Axlon Ramdisk. This DOS attempts to find something in the drive hardware which is not present in the Ramdisk and gives an error message.

You really have to commit yourself to this DOS because you must go through lengthy file conversions to use it. If you're at all like me, with hundreds of disks in DOS 2 compatible format lying around, you will probably find the time required to convert over to this DOS prohibitive.

SpartaDos is a very fine product, but its appeal is limited to a relatively small number of Atari owners with

continued on next page

very specialized requirements. Consider this product carefully before you buy.

MYDOS 3.08A

MYDOS, by Wordmark Systems, is the DOS shipped with the ATR8000. It is a menu driven DOS which supports all documented Atari DOS 2 functions and is compatible with all Atari drives and DOS 2 type files. The menu is nearly identical to DOS 2 with a couple of additions: There is a status line above the menu informing the user of online drives and their densities and default drive number, and two different options, O and P.

MYDOS option O is used to specify drive type, number of buffers, and write verify on/off. If you have a configurable drive, you can specify formatting for 5 1/4" and 8" drives with options similar to SpartaDos. MYDOS allows 35, 40, 77 and 80 track formats for single or double sided drives in single or double density.

MYDOS option P allows the user to change drive density and specify the default drive (it need not be drive 1).

MYDOS preserves the best features of both Atari DOS 2 and SpartaDos. No special hardware is required but special drive types are supported. MYDOS files are directly compatible with single density DOS 2 files. MYDOS does not seem to have the same memory conflicts with machine language programs that SpartaDos has.

This is definitely one of the easiest to learn and one of the most potentially useful DOS's available for the Atari.

TOPDOS 1.4

TOPDOS is one of the most friendly, full-featured and useful DOS's for the Atari. In fact, it's hard to imagine that any one person could think of all the commands and utilities provided by this product. In spite of its apparent complexity, TOPDOS remains easy to use. The newcomer can take to it like DOS 2, while the more experienced can really customize TOPDOS to fit just about any conceivable system configuration and purpose.

TOPDOS is menu driven with command options identical to Atari DOS 2, except they provide considerably more flexibility. The disk directory command A, for example, includes such options as: number of columns to display directory (up to 2 on screen and 6 on a printer), alphabetize disk directory, compress file directory (to overwrite deleted files and minimize search time), list deleted files (which haven't been overwritten) and list current and deleted files (which can also be un-deleted).

Many people will convert to this product as they are exposed to its many features.

Some of the other standard commands which are considerably enhanced over DOS 2 are:

1. Copy, with the following options: append, query/no query, merge and update.

2. Delete, with query/no query.

3. Initialize disk in TOPDOS format, Atari format, and nonstandard drive format. TOPDOS format differs from Atari format in that the files do not include file numbers within the individual file sectors. This special format is required to take advantage of a few special features of TOPDOS such as alphabetization and compression of the disk directory, and to handle double sided double density drives. Atari DOS cannot read the TOPDOS format but TOPDOS can read and write Atari DOS formatted disks.

The nonstandard format option allows those users with compatible drives to specify the number of sectors desired, up to 944 per side in single density and up to 1968 in double density (8" drive).

It is also possible to reformat only the VTOC, on a previously formatted disk. This takes approximately 3 seconds instead of the usual 40 seconds.

4. Duplicate Disk, will sense if your destination disk is of the same format as your source disk and will reformat your destination disk, if required.

5. Binary Load, includes the option to load but not run a binary file. It will also report the load addresses present in a binary file.

6. An online help facility for each command.

Besides the commands shared by DOS 2 and TOPDOS, there are some significant additions. Directly from the main menu you can build "command files" similar to the batch processing files of DOS XL. These command files can call other command files, something DOS XL won't allow. There is a mini-monitor which allows the user to examine and modify specific bytes of memory, and a trouble option to translate cryptic error numbers into brief English explanations.

The "Set/Status" command reveals a TOPDOS customizing menu. Just a few of the options include definition of drive density and system drive number, residence on/off (resident TOPDOS uses 9–10K.), bypass cartridge allowing the user to bypass the cartridge on boot-up and directly access the TOPDOS menu, and such bells and whistles as change left margin and redefine command prompt.

The Axlon Ramdisk and the Mosaic 64 board are fully supported with some versatile options. One can use the Ramdisk in single or double density, change the drive number of the Ramdisk, define it as the system drive, and define which 16K banks are active.

A summary of system status can be called by typing [/] [RETURN]. The status summary includes: the number and density of online drives, current system drive number, the current MEMLO and MEMTOP, number of disk buffers, TOPDOS or Atari disk format, MEM.SAV on or off, DOS resident on or off, cartridge bypass on or off and write verify on or off.

Describing all the subtleties would take about 82 pages (the length of the TOPDOS documentation). I have a feeling that many people will convert to this product as they are exposed to its many fine features.

WHAT TO BUY?

Before you buy any DOS, keep in mind that some kind of DOS is going to come with (or came with) your disk drive, making it essentially free. If you're going to buy an additional DOS, examine your needs and look for a product that fits your purposes. Certain things, like special hardware requirements, narrow the field. And ease of use is important.

One personal opinion (shared by the **Antic** editors): Don't waste your time with Atari DOS 3!

Atari DOS 2.5 will surely be a hit with many users because its performance (very good) to price ($0.00) ratio is tough to beat. Just keep in mind that DOS 2.5 won't do everything! There may be a DOS out there more suited to your needs that's deserving of your hard-earned money.

Eric Clausen has owned his Atari since January, 1982. He is a member of ABACUS, the San Francisco users group, and he recently received his dentistry degree from the University of the Pacific. Eric plans to continue his medical training toward a PhD in medicine.

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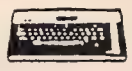

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Plus golf course "construction set"

by DAVID PLOTKIN

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When you get tired of dodging demented robots, skulking around caves and frying alien creatures, try your aim at miniature golf, a surprisingly holesome (ouch) game for the entire family.

There's no real limit to the number of players—you could even take this game to a party, along with last month's "Beer Party Atari!" The computer will keep track of each golfer's scores and turns to play.

But first, type in Listing 1, check it with TYPO II and SAVE a copy before you RUN it.

Swing your club by moving the joystick. The club appears as a square with a missing corner. Pushing the joystick button starts your shot. The farther the distance between the club and the ball, the harder the ball will be hit. This means you can try some interesting bounce shots.

The important part of the club is the missing corner. The velocity is calculated from the distance between this corner and the ball; the direction the ball travels is also calculated from the corner.

Holes-in-one are possible on all the holes provided.

When you sink the ball, play moves to the next player, until all players have played all the holes. The game is then over, and a screen display shows everyone's score plus the name of the winner.

To add additional realism to the course, there is a moving barrier, reminiscent of the windmills found on real miniature golf courses!

Sometimes you totally miss the ball. If your opponents are kind-hearted souls, all you need to do is press the START button—and you can take the shot over again. These extra shots don't even show up on your score.

GOLF CONSTRUCTION

Eventually you'll want to design your own holes. That's when you can use the Miniature Golf Construction Set (CS), which generates data statements that are appended to the MG program in line 2000. To use CS, type in Listing 2, check it with TYPO II, and SAVE a copy.

Start with graph paper. It's best to design your hole before going to the computer. You're designing a screen for Graphic Mode 7, so you'll need a grid spanning 0–159 horizontal (x coordinate) and 0–79 vertical (y coordinate).

In constructing a hole, you choose from seven types of prefabricated obstacles (see *Figure 1).* These include four types of right triangles—right, left, up and down, named according to the direction that the apex points. The fifth obstacle is a rectangle, the sixth is a diagonal line, and the seventh a moving barrier. In each case, you determine where to put the obstacle and how big it should be.

When you first run CS, it will ask you where you want your output. Either give D:FILENAME (or C: for cassette). The screen will also request the hole number.

You'll then be asked where you want the hole placed, first with the x position coordinate and then the y coordinate. The program will always specify the information and format it wants.

After locating the hole, specify the starting position for the ball, again by entering the x and then the y coordinates.

With these starters completed, you can place the obstacles. The CS program will run through a sequence, offering you a chance to include down triangles, up triangles, squares, and so on. In each case, you are asked how many obstacles (0–15 of each), and are then led through the process of locating each one.

SAMPLE DESIGN

Let's create a sample hole. When asked for a hole number, type [1] [RETURN]. Look at *Figure 2* for a sample design. Let's say you want your field to have five objects: a down triangle, an up triangle, a rectangle, a diagonal barrier and a moving obstacle.

Start by placing the hole. The CS program will prompt you to enter x, then y. Type [20] [RETURN] [20] [RETURN]. Place the ball at, say, 150,60 by typing [150] [RETURN] [60] [RETURN].

You'll now be asked how many down triangles you want. Enter [1] and a [RETURN]. Specify the position by locating the baseline—because it's a right triangle, the computer will do the rest. Enter the coordinates in the format requested, with a comma between each number and a [RETURN] at the end of the entry. Thus, a small down triangle in the upper right corner of the field would be 141,0,159.

Establishing an up triangle works the same way. Choose [1] up triangle, then enter 40,79,141 [RETURN] to get the large triangle in Figure 2.

If you don't want a certain obstacle, enter [0] when asked "How many?". For this sample, we don't want any right or left triangles.

Choose [1] square/rectangle then specify the square's location by naming the two corners: 70,0,120,20.

The barrier starts with a yes/no choice. Choose [1], and then establish the length of the line along which the barrier moves, as well as the speed it moves. Higher numbers are faster. Use 5,40,60 for the placement and 3 for the speed.

The diagonal lines are located by specifying a corner's x and y coordinates, followed by the lower x position. Try 5,50,26.

When you're finished making a fiendishly difficult hole, you'll be presented with the main menu, which has four choices. The first thing you'll want to do is look at the hole you've just constructed.

If the program encounters any errors attempting to draw the screen, it will stop and let you look at the screen to try to figure out what went wrong. The most common error is to place a triangle too close to the screen edge, so that when the computer attempts to draw the missing corner, you get a cursor out of range.

Touching any key returns you to the main menu, where you may wish to use the second selection, Edit. This takes you to a submenu with a list of obstacles to edit. You must re-enter ALL the data for the particular obstacle you are editing. To return to the main menu, choose option 9 from the submenu.

The third choice lets you Save your data. The final choice is to Quit. If you make this choice by accident, however, all is not lost. Just type GOTO 240 and press [RETURN].

PLAYING NEW HOLES

Now that you've gone through all this

continued on next page

Figure 1
OBSTACLES

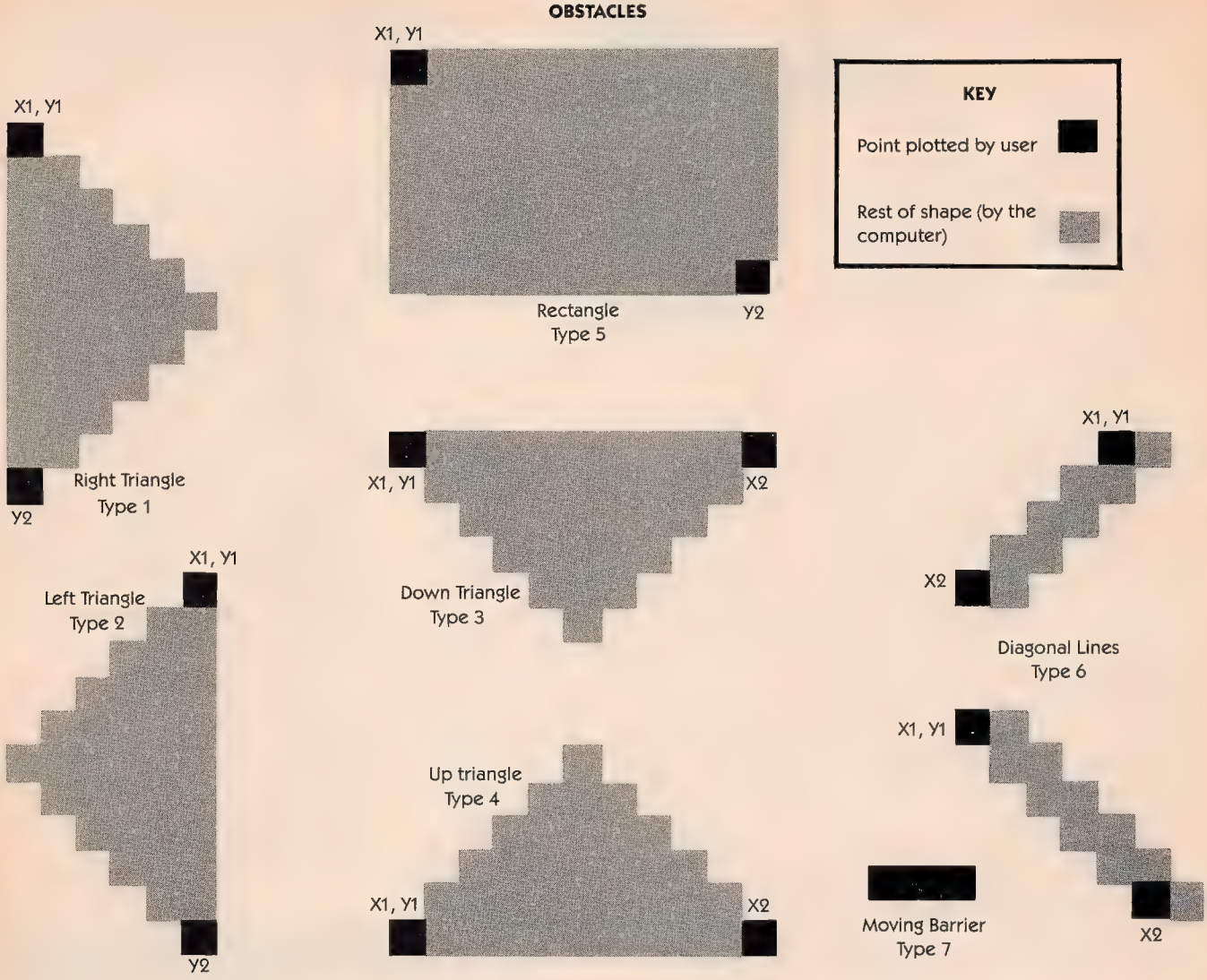
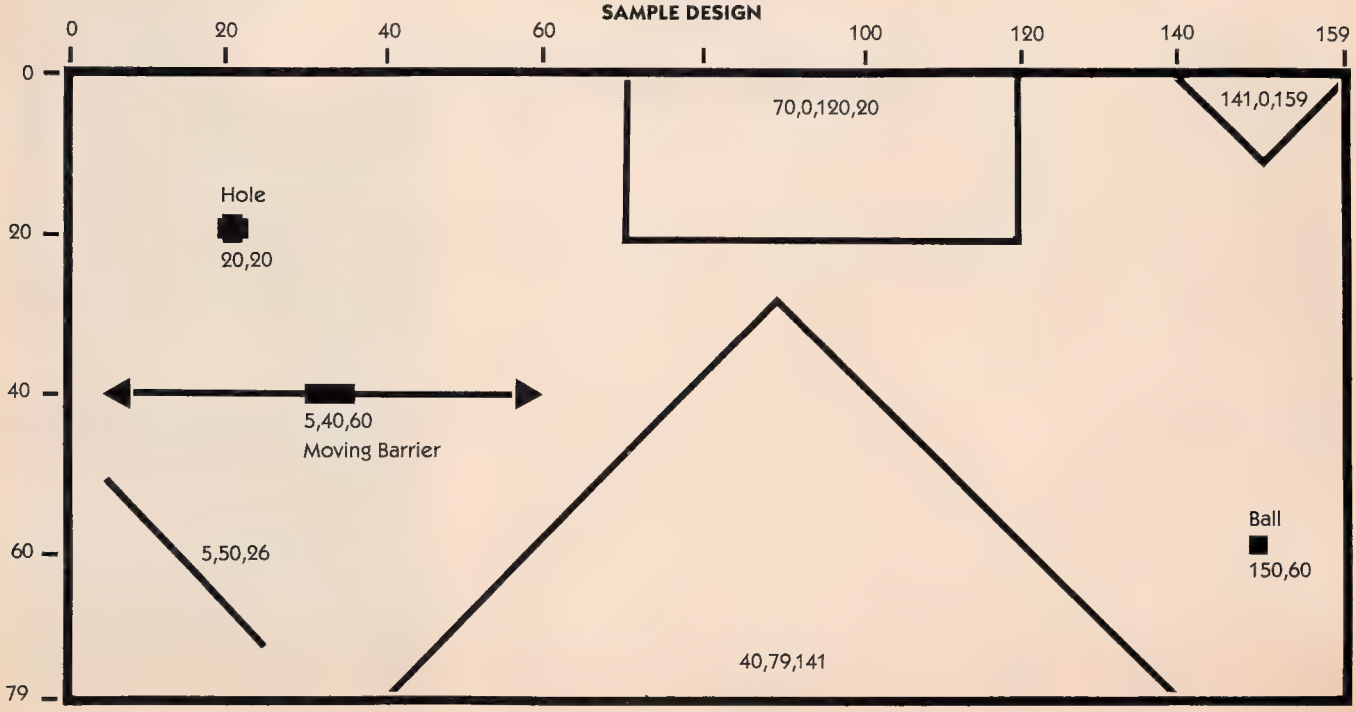


Figure 2
SAMPLE DESIGN



work to generate the data, how do you use it? First, LOAD or CLOAD Miniature Golf into your computer. Then ENTER "D:FILENAME" or ENTER "C:" the data created using MGCS. For example, if you used D:ROUND for the filename to save your data when using CS, then you would ENTER "D:ROUND". If you are adding more holes, then you will need to adjust the variable MAXHOLE in line 10 of Miniature Golf.

Then SAVE the version with the new hole data, and RUN it. Be warned that if you chose to create a hole number using CS that already exists in your current version of Miniature Golf, your new hole will replace the old one. This change becomes rather permanent if you then write the new version with the same filename as the old one back to the same disk.

LIST OF VARIABLES

F1—flag so that you can't keep pressing the START button and back up your score.

STARTHOLE, MAXHOLE—the hole to start on and the final hole.

PN, NUMPLAY—the current player number, and the total number of players.

HOLSCR—the current hole score.

HOLENUM—the current hole number.

TOTAL—array which holds each player's score.

OLDX, OLDY—the ball's x and y coordinates before your last shot.

BALLX, BALLY—ball's x and y coordinates.

MX, MY—ball's x and y velocities.

HX, HY, HSX, HSY—the magnitude and sign of the ball's x and y velocities.

BX, BY—moving barrier's x and y coordinates.

RITEX, LEFTX, SPEED—the moving barrier's limits of back-and-forth motion, and the speed of movement.

CLUBX, CLUBY—x and y coordinates of the club.

CLUB$, BARRIER$, HOLE, BALL$, BLANK$—arrays to hold the shape data of appropriate items.

UD1$, UD2$, UD3$—arrays which hold the data for the machine language routines to move the players (ball, club, barrier).

NAME$—array to hold the names of each player.

PROGRAM TAKE-APART

5-15 Set up and call the subroutines to get information.

20-50 Main Loop. For each hole (line 20), it updates the text window and draws the hole (line 30). Each player moves the club and shoots (line 40). Then erases the hole (line 50).

60 Jump to Game Over routine.

700-790 Moves the ball around the field. If a collision is detected with the playfield or the moving barrier then velocities are adjusted. If the ball goes in the hole, calls the subroutine at 850. Note that lines 775-776 do exactly the same thing as the subroutine at line 800 (move the moving barrier), but at a 25% increase in speed, because you don't have to call a subroutine.

850-880 Sound and graphics for the ball going into the hole.

900-990 Moves the club when you move your joystick. It reads the joystick (lines 910–920), checks the status of the START button and the flag (line 925), adjusts and redraws the ball and club if the [START] button is pushed the *first* time, and erases and redraws the club (930). If the button is pushed, lines 940-960 calculate the x and y distances between the club and ball, and "swing" the club. Note that if the club and the ball have the same coordinates, you get a nasty beep.

1000-1090 Read the data that defines each hole and draws the hole, including the club and ball.

1100-1130 Draws a type one or two obstacle.

1200-1230 Draws a type three or four obstacle.

1300-1330 Draws a type five obstacle.

1400-1420 Draws a type six obstacle.

1430-1440 Draws a type seven obstacle.

1450-1490 Erases the P/M shapes by writing zeros from BLANK$ into their positions.

1500-1550 Gets the names of the players. This routine has you input the names into a temporary string, then pads any unused spaces (up to 10) with blanks so that each name is the same length. That way, we can find the name in the larger string NAME$.

1600-1735 Sets up the graphics, memory and P/M space and enables P/M graphics. It also reads the shape data into the arrays, and reads the machine language routine data into their arrays.

1750-1770 Updates the text window.

2000-2141 Data for the holes.

3000-3050 The introductory screen.

3100-3320 The Game Over sequence.

David Plotkin, a regular contributor to ***Antic****, has recently been noted for his ACTION! games in these pages. He is a chemical engineer by profession.*

Listing on page 64

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SLIDE
continued from page 33

it is also important for a program to function quickly. The program needs to take as few moves as possible to win. One idea here is to always prune the tree of possible moves that are identical to the previous move—the program shouldn't spend its time retracing its steps.

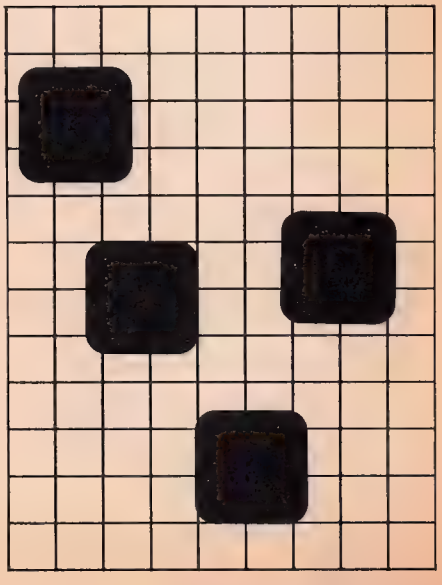
The hardest part of intelligent game design here is to produce a reasonable quiescence function, the subroutine that prunes branches that don't seem fruitful.

Your function will be measured by the number of spurious nodes that are expanded to a solution en route—the perfect function will always prune all spurious nodes. The worst function will expand each node at one level in the tree before looking to the next level—this is called an exhaustive search, and wastes computer time and memory.

If the design of "artificial intelligence" intrigues you, why not see if you can use this puzzle program as a starting point for your own program which *solves* the 24 Puzzle? **Antic** would be interested in publishing the shortest and most elegant solution sent in by a reader.

Mark Moore is from Weatherford, Oklahoma and this is his first publication in ***Antic****.*

Listing on page 56.



SOFTWARE LIBRARY

Antic type-in listing section includes every full-length program from this issue. Listings are easier to type and proofread, easy to remove and save in a binder if you wish.

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DISK SUBSCRIBERS: You can use all these programs immediately. Just follow the instructions in the accompanying magazine articles.

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APX CLASSICS from ANTIC

XE, XL COMPATIBLE

APX lives again . . . via Antic!

The Atari Program Exchange was one of the most advanced software distribution concepts ever created for personal computers (IBM came out with something very similar for the PC in 1984). APX published the best software submitted by Atari users from all over the world. These programs were outstanding—but considered too specialized in appeal for Atari's mass merchandising channels.

APX software was packaged simply but tastefully and sold mostly through well-written catalogs. With the reorganization of the Atari company and the shutdown of APX operations, Antic arranged directly with the authors to re-release many of the very best APX programs—games, real world applications, powerful utilities, demonstrations and tutorials.

APX Classics Line from ANTIC brings back these fine programs that had been unavailable to Atari users for many months. But you'll also notice that some of these programs have never been published anywhere before . . .

We are including this brand new software with our top-of-the-line APX Classics because we want you to know they are as good as the best of APX. (Also a lot are the latest works of former APX star programmers.)

Antic will continue to release additional outstanding programs in the APX Classics line. If you have written a professional-quality program for Atari computers, submit it to **APX Classics from ANTIC**, 524 Second Street, San Francisco, CA 94107. We pay competitive royalties and are the largest single information source for Atari users.

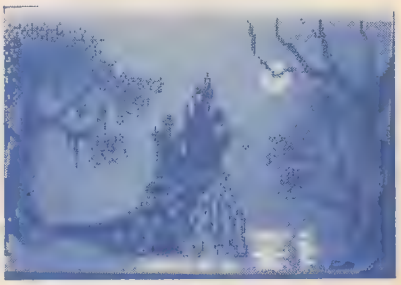
Each program disk is self-documented. Antic is in no manner associated with the Atari Program Exchange. Atari is a trademark of the Atari Corp. Antic is an independent periodical not affiliated in any way with Atari Corp.

All software available on disk only.

NEW!

THE FAMILY TREE

by Harry Koons
Written in BASIC
THE FAMILY TREE can introduce your family to its fascinating history. This program lets you enter and display all pertinent information for each person in your family pedigree. The screen displays a tree with a unique cursor. You move the cursor about the tree using a joystick or keyboard to select a person from the chart. Historical data can then be displayed or edited on the scren. You can save about twenty-four generations on one disk and print charts out on a printer (you may send printed charts to distant relatives to get their help in completing your family's history). A sample pedigree chart is included with this one-of-a-kind program.
REQUIRES: Atari BASIC language
OPTIONAL: One Joystick controller
#AP133 $19.95


Drawit

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(See page AC-9)

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Personal Productivity

NEW!

WORD MAGIC®

by Blue Collar Software®
Written in machine language
WORD MAGIC is a first in word-processors for the Atari. It includes *every* major feature of the most popular word-processors, plus many special ones, including super-fast cursor moves, on-line help files, automatic, on-screen print formatting, joystick or trackball cursor control, cut and paste between files, any type font—and it supports every printer with a built-in printer driver editor. WORD MAGIC is extremely fast with all operations, and is menu-driven for easy use. The program works with Antic's DATA MANAGER XL mail-merge feature for creating custom form letters and reports. When used with GRAPHIC MAGIC, Epson and Gemini printer owners can insert any graphic into any document and the program will automatically print it and paginate the document. You can even see where the graphic will be in the on-screen formatting!
OPTIONAL: One Joystick or Trackball controller #AP130 $19.95

GRAPHIC MAGIC®

by Blue Collar Software®
Written in machine language
GRAPHIC MAGIC is FREE when you buy WORD MAGIC. This unique screen print utility for Epson and Gemini printer owners lets you include any graphics picture created with B/Graph, graphics mode 8, Micropainter, or Microillustrator in your WORD MAGIC document. Your Epson or Gemini will print it out in the format that you specify (½ page or ¼ page) automatically while printing the document. Together, WORD & GRAPHIC MAGIC are the next best thing to using a Macintosh & Imagewriter to combine text and graphics in fancy documents.

DRAWIT

by James Burton
Written in machine language
DRAWIT is an outstanding drawing program that exploits the Atari's superior graphics capabilities. With 16 different colors and 8 hues at your disposal you can create up to nine pages of your latest masterpiece in memory. Features include automatic fill, page merging, 2 zoom levels for detail work and page wipes and an animator.
REQUIRES: One Joystick
OPTIONAL: Atari BASIC
#AP108 $19.95

NEW!

DATA MANAGER XL

by William Bartlett
Written in BASIC and machine language
DATA MANAGER XL is a general purpose data management program that is powerful and flexible enough for most applications. The number of records is only limited by free disk space; up to 100 fields per record are allowed, with up to 120 characters per field. Totally reliable indexing will make you breathe easily—and you can add and delete fields from your record structure at any time. The reporting capability is exceptional in DATA MANAGER XL—there is an internal "mini word processor" for your reports and form letters, plus a powerful mail-merge option for Atariwriter* and Antic's WORD MAGIC. The "Tools Manager" module has database diagnostics, plus you can also check the accuracy of your disk drive speed. Comprehensive documentation is included.
REQUIRES: Atari BASIC
#AP129 $19.95
Atariwriter© Atari Corp.

Mapware

MAPWARE

by Harry Koons and Art Prag
Written in BASIC
Create and save high-resolution world maps with MAPWARE. You can locate all the main land masses on Earth—with 9000 pairs of geographic coordinates at your disposal. MAPWARE is the only source of this data for Atari BASIC programmers, HAM radio/satellite applications, geography, and cartography. You can create and display maps in four different projections—and you can draw a world map from above any geographic spot you wish. MAPWARE comes on two diskettes—one for the programs and one containing the coordinate data.
REQUIRES: Atari BASIC
#AP134 $19.95

INSTEDIT

by Sheldon Leemon
Written in BASIC and assembly language
The best character set editor we've seen. INSTEDIT can help you make maximum use of the advanced graphics capabilities of your Atari computer. You use a joystick to edit a character in an eight-by-eight matrix. INSTEDIT simultaneously displays the modifed character in all six graphics modes. You can even create objects to use with player/missile graphics routines. You can store a character set for further work and even write it to a disk file in the form of BASIC DATA statements, assembler source code, or even an entire BASIC subroutine for incorporating your character set into a program.
REQUIRES: Atari BASIC
One Joystick
#AP117 $19.95

NEW!

CHAMELEON CRT TERMINAL EMULATOR

VER. 4.02 NEW VERSION
by John Palevich
Written in machine language
Convert your Atari computer into a computer terminal! For five terminal types, "Glass TTY," ADM-3A, DEC VT-52, IBM 3031 ASCII, and a Test terminal, CHAMELEON supports most-used features (including Kermit protocol). The wide-screen 80-column emulation (displays 40 columns at a time with auto horizontal scrolling). Use with UNIX operating systems. All terminal characteristics are user-definable. Supports the Atari 835 & 1030 modems and now has autodial capability (for sixteen phone numbers). CHAMELEON is now totally compatible with AMODEM.
REQUIRES: 48K RAM
#AP113 $19.95

Custom Blend

NEW!

SCREEN PLOT

by Robert Wilson and Michael Reichmann
Written in compiled BASIC and machine language
SCREEN PLOT is an extremely useful graphics program that allows you to transfer color screens created by almost any Atari graphics creation program to paper via the Atari 1020, Radio Shack CGP-115, Mannesmann Tally Pixy 3, or Sweet Pea color plotters. This is the *only* program of its type available, and allows you to control many output characteristics. You may plot in different sizes, display pictures and preview plotter pen colors on the screen, and change aspect (display) ratios. You can superimpose one screen-plot on top of another. Many creative opportunities are possible with SCREEN PLOT—it even includes the BASIC source code so that you may study how a plotter driver is written.
REQUIRES: A compatible plotter
#AP135 $12.95

NEW!

PRINTER DRIVER CONSTRUCTION SET

for Atariwriter*
by John Eric Hinckley
Written in machine language
Atariwriter is one of the most popular word-processors available for the Atari, but does not normally support many of the most popular printer's features. PRINTER DRIVER CONSTRUCTION SET will make your Atariwriter cartridge *completely* compatible with whatever printer you own. The program supports all of your printer features, including centering, elongated text, multiple fonts, proportional spacing, underlining super/subscripts, and blocked-right text. The program disk includes printer drivers for the most popular printers, such as the Epson, Gemini, Okidata, NEC, C-ITOH, and various daisywheel printers. If you own any other printer, the program will prompt you once, the first time, for control codes from your printer manual.
REQUIRES: Atariwriter cartridge, any Atari-compatible printer
#AP131 $19.95
*Atariwriter© Atari Corp.

CUSTOM BLEND

by Al Casper
Written in machine language
If you do any programming with your Atari computer, CUSTOM BLEND will give you the power to create any combination of text and graphics modes — even Display List Interrupts — automatically! Just sit back in your chair with your joystick, and CUSTOM BLEND will write BASIC subroutines controlling any of the Atari's 14 display modes. Get results that used to take hours of trial & error—in minutes! The Automatic Display List Interrupt feature makes it easy to put two totally different character sets on the screen at once—and double the number of colors you have to work with!
REQUIRES: One Joystick
OPTIONAL: Instedit; Atari BASIC
#AP118 $15.95

STOCK MANAGEMENT

Atari APX Award Winner

by Greg Thrush
Written in BASIC and machine language
STOCK MANAGEMENT is an ideal way for you to efficiently organize your transactions and then review your options. Once all your transactions are entered, STOCK MANAGEMENT can tell the current value of your stocks, equity for specific stocks, capital gains for a given year and much more! Comes with a complete set of commands specifically geared for historical tracking of stock portfolios.
REQUIRES: Atari BASIC
#AP106 $19.95

Personal Productivity

DEEP BLUE C COMPILER

Atari APX Award Winner

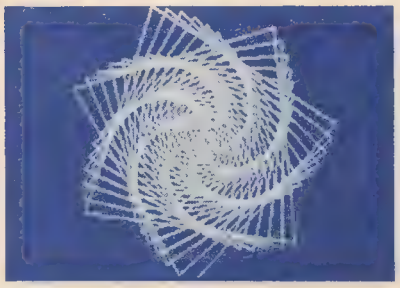
by John Palevich

Written in C

More powerful and faster than BASIC, yet free of the tedious hours of debugging common in assembly programming, C is a valuable general purpose language. Pointers, recursive functions, and high-level conrol structures make complex software systems easy to design, implement, and maintain. Furthermore, C is the de facto systems programming language of the new generation of "workstation computers." DEEP BLUE C is a proper subset of version 7 C, which means that programs written for it will run almost without change on computers supporting the full language.

REQUIRES: 48K RAM; A text editor such as Word Magic/AP130

#AP114 $19.95



Mathlib for C

REAL ESTATE CASH FLOW ANALYSIS

Atari APX Award Winner

by Richard Lindgren

Written in BASIC

Real estate investing can be easy! With this program, you can learn the ins and outs of real estate totally risk-free. Now your Atari can assist you in analyzing the costs and benefits of income-producing property. The three main modules are completely integrated; the Data Editor, Cash Flow Analysis section, and Amortization section. For example, the Amortization section will calculate data on loan arrangements. This data can then be fed into the Cash Flow section to analyze how it will affect the profitability of that investment. A sample application is included, and the documentation is excellent. Some knowledge of investment terminology is necessary.

REQUIRES: Atari BASIC

#AP125 $19.95

STRATEGIC FINANCIAL RATIO ANALYSIS

Atari APX Award Winner

by Richard Lindgren

Written in BASIC

FREE with REAL ESTATE CASH FLOW ANALYSIS! If you are interested in investments of any type, you can use STRATEGIC FINANCIAL RATIO ANALYSIS to compute ratios that measure a firm's profitability, liquidity and use of debt. S.F.R.A. can also help interpret a management's business strategies using "what if" analyses to evaluate the impact of a business decision on future performance. You can work with two sets of information at once—essential for comparisons. Easy use and thorough documentation make this program a good investment.

REQUIRES: Atari BASIC language

#AP125 $19.95

NEW!

THE HELP SYSTEM

by Michael Barall

Written in machine language

Now you can create professional help systems for programs that you have written! The Help Text Compiler and The Help Text Viewer will automatically generate help systems controlled by menus and sub-menus. You can create any arrangement of menus and sub-menus that you want, with up to 25 levels of sub-menus available. You can modify the source code (included), and build your help systems into any program that you write. Put those special keys, like the HELP key, to work for you. THE HELP SYSTEM was written by a Stanford mathematician who directed Advanced Operating System development at Atari, Inc.

REQUIRES: Text Editor (such as Word Magic/AP130

OPTIONAL: Atari Macro Assembler or MAC/65

#AP136 $15.95

MATHLIB FOR DEEP BLUE C

Atari APX Award Winner

by Frank Paris

Written in assembly and DEEP BLUE C

Antic's family of DEEP BLUE C software is extended with MATHLIB, a whole new library of math functions designed to expand your DEEP BLUE C COMPILER into the area of floating point calculations. MATHLIB provides the access that DEEP BLUE C doesn't to the functions in the ATARI Operating System Floating Point ROM. Among the 32 new math functions that MATHLIB provides are: integer/floating point, degree/radians, and ATASCII/floating point conversions; floating point addition, subtraction, multiplication, division and square roots; natural and base 10 logarithms and exponentiation, and more!

Demonstration programs provide examples of how it's used, and how you can use MATHLIB in Turtle graphics.

REQUIRES: DEEP BLUE C COMPILER (#AP114)

#AP132 $19.95

DEEP BLUE SECRETS

by John Palevich

Written in C and machine language

Also available is DEEP BLUE SECRETS, the source code for DEEP BLUE C COMPILER and linker and the source text for the interpreter. With it you can maintain, modify, and extend this C language for your programming needs.

REQUIRES: DEEP BLUE C COMPILER; Atari Macro Assembler 48K RAM

#AP115 $19.95

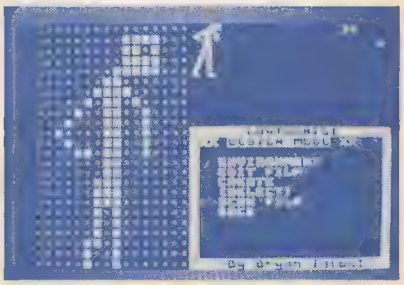
Personal Productivity

CARTOONIST

by Bryan Talbot
Written in BASIC and machine language

Did you ever wish that you could create some exciting graphics with your Atari? You can with CARTOONIST. This menu-driven animation program gives you full control over your movie characteristics. Your frames can be short or tall, different colors and shades, all at once! You can draw, edit, insert or delete frames, copy and exchange ones until you're ready to animate them. Then, CARTOONIST will play the frames back, one after another, at any speed you wish, up to 200 frames-per-second. It's so versatile that anyone who wants to learn about traditional animation can begin right away! CARTOONIST is loaded with features that make it perfect for programmers who want to use animated sequences.

REQUIRES: Atari BASIC language. One Joystick controller
OPTIONAL: One set of Paddle controllers #AP124 $19.95


Cartoonist

NEW PERSONAL PRODUCTIVITY SOFTWARE!

These three menu-driven programs are designed for everyone—no special computer knowledge is required! Developed to give Atari owners solutions to everyday organizational problems, each one includes thorough documentation.

THE EXPENSE TRACKER

by Erv Friedman
Written in BASIC and machine language

THE EXPENSE TRACKER will automatically keep track of all your home or business expenses. Its large capacity allows you to track 500 expense days on any disk with up to ten expenses per day (a combined total of 5000 expenses on a single diskette). You can catalog expenses by type, project, and employee (you add your own definitions to the ones already provided for you by the system). THE EXPENSE TRACKER offers complete reporting on transaction, project, or employee details. Reports can be printed in detail or summary—by month or year-to-date.

REQUIRES: Atari BASIC
#AP128 $19.95

THE HOME INVENTORY

by Erv Friedman
Written in BASIC and machine language

THE HOME INVENTORY is the *only* complete inventory system available for Atari computer owners. You can now catalog every item in your home or business—ideal for insurance and tax purposes. The program will identify items by type, by room (or building) *and* location within room (up to 500 items per disk). You can define your own types, rooms and locations and add them to the categories that come on the disk. THE HOME INVENTORY allows you to track manufacturer, serial numbers, model numbers, purchase date, and price. The system offers complete reporting by inventory number, type and location. For tax purposes, you can receive reports on "straight line" depreciation or single item depreciation.

REQUIRES: Atari BASIC
#AP127 $19.95

THE ROSTER

by Erv Friedman
Written in BASIC and machine language

THE ROSTER is an easy-to-use system for managing lists of names and addresses for any member of your family. Its large capacity allows you to store up to 500 entries on any disk. THE ROSTER prompts you to enter all address and telephone data; plus, each entry can have three special fields for things like birthdates, anniversaries, etc. When you want to print your entries out, THE ROSTER will automatically select by any criteria you wish: name, state, zip code, or your own special codes. The program also features variable spacing to fit any label or envelope, plus complete reporting for all entries (including a handy phone list).

REQUIRES: Atari BASIC
#AP126 $19.95

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800-227-1617, ext. 133 (in Calif. 800-772-3545, ext. 133)
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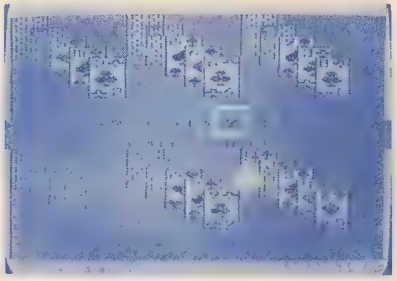
SEVEN CARD STUD, A USER PROGRAMMABLE SIMULATION

by Monty Webb
Written in BASIC and machine language
SEVEN CARD STUD simulates five card-playing partners with multi-programmable personality traits. You can "fix" the game to determine each player's characteristics (your poker buddies maybe?). You decide if a player is hard, average or easy to bluff, how often the player raises, and overall playing strategy (too loose, smart or too tight). Manipulating the competition allows you to sharpen your poker skills without becoming discouraged. To make it even better, SEVEN CARD STUD uses 100 percent joystick control for all commands and play options. Poker players are sure to enjoy the extra touches like realistic graphics and sounds in this excellent simulation.
REQUIRES: Atari BASIC & one Joystick #AP123 $15.95


Seven Card Stud

RAID ON GRAVITRON

by Jim Sommers
Written in machine language
RAID ON GRAVITRON is a point-of-view space battle with outstanding 3-D effects. You dogfight with cyborgs from Gravitron to save the earth. Make sure your shields aren't vaporized by their fireballs! Your Emperor Eddie then commands you to warp out of our universe in a suicide mission to Gravitron itself. During your trip you have to navigate the booby-trapped time tunnels and shoot your way through the statis walls. You must then seek out and destroy your final target.
REQUIRES: One Joystick
#AP121 $12.95

NEW!

WEAKON

by Eric Freeman
Written in machine language
WEAKON takes you into the thrilling new world of inner space and sub-atomic particles. You must search for and capture elusive weakons to build up your power generator. Speeding gamma photons, radiation clouds and mesons threaten your very existence—and to make matters worse, all these particles accelerate after several weakons are taken prisoner!
WEAKON is a classic arcade shoot'em-up with unique graphics and effects. With ten levels of difficulty, mastering WEAKON should provide a real challenge.
REQUIRES: One Joystick
#AP122 $15.95

Raid on Gravitron

CRIBBAGE

Atari APX Award Winner

by Jose Suarez
Written in BASIC and assembly language
If you're not a cribbage player already, this quick and exciting version will convert you first time around. CRIBBAGE pits your ability against the computer to assemble winning card combinations and rack up the ultimate score of 121 points before it does. Fast pace and superb graphics make this game a winner!
REQUIRES: Atari BASIC
#AP102 $12.95

Cribbage

Phobos

PHOBOS

Atari APX Award Winner

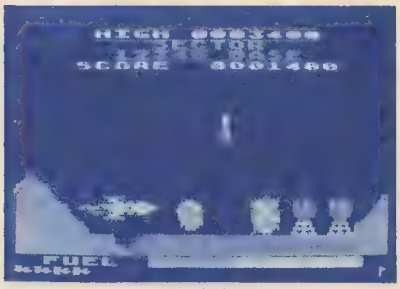
by Greg Christensen
Written in machine language
Can you master the 16 levels of defense and destroy the Martian's command center? Take your fighter into the core of Mars's largest moon—flying inside harrowing caverns, picking up fuel and knocking out missiles. Phobos's awesome defenses include Compound Laser Gates within narrow pathways that require fine maneuvering; the fast action and great graphics are guaranteed to keep your adrenaline going! With four skill levels, everyone can set their own pace. Fans of CAVERNS OF MARS will find PHOBOS exceptional.
REQUIRES: One Joystick
#AP119 $15.95

SPACE WAR

by Jay Jaeger
Written in machine language
This two-player galactic shoot-out is a hot new adaptation of the classic mainframe computer game developed at M.I.T. in the early sixties. Your goal: to destroy your enemy's space ship before it gains control of our solar system. The sun is both an ally and potential pitfall — you use its gravitational waves to avoid torpedoes and propel your ship to strategic positions. But if you get too close, you're a frozen sitting duck for enemy forces.
REQUIRES: One Joystick
#AP101 $12.95

GALAHAD AND THE HOLY GRAIL

by Douglas Crockford
Written in machine language
The search for the Holy Grail goes on in this challenging and exciting graphic adventure by one of Lucasfilm's top game programmers. In GALAHAD AND THE HOLY GRAIL, you will encounter monsters galore, evil knights, and even an occasional dragon. Fear not! Enchanted walls lead you to the sanctuary of secret portals — the lucky finds of swords and keys will assist you in your quest. This was one of APX's all-time best-sellers!
REQUIRES: One Joystick #AP110 $15.95


Mars Mission II

SNARK HUNT

Atari APX Award Winner

by Jeff Johannigman
Written in BASIC and machine language
Snarks (like sharks) are difficult beasts to detect — hidden by mysterious depths. In SNARK HUNT, vorpal beams are your only tool to track these elusive creatures. The beams will react in different ways to the presence of snarks, and you will find your logic taxed to the limit trying to decipher where the snarks are. Up to 8 players can attempt this mission; higher levels create a special challenge.
REQUIRES: Atari BASIC language; One Joystick
#AP105 $15.95

Taxicab Hill

DOG DAZE DELUXE

by Gray Chang
Written in machine language
A dog's favorite fantasy is at the core of DOG DAZE DELUXE—to become top dog by staking your claim to all the new fire hydrants popping up on the screen! It's not easy—careless drivers and competing underdogs are your constant hazards—but no one said a dog's life ever was! Excellent 3-D effects and the one-or-two player options make this game fun for everyone.
REQUIRES: One Joystick per person
#AP111 $12.95

NEW!

TAXICAB HILL

by W. Morris & R. Hoffman
Written in machine language
SMASH! CRUNCH! BANG! goes your taxi as you race up and down the hills of San Francisco in TAXICAB HILL. Watch out though, 'cause those pirate cabs are always trying to steal your fares. The radio in your cab keeps drifting to a crazy jazz station, and those pirates never stop trying to steal your livelihood. There are lots of screaming pedestrians waiting for a lift, and when they pay you, you'll have enough $$$ to flip over the edge into the next San Francisco neigbhorhood. All of us San Franciscans loved TAXICAB HILL the first time we saw it at Antic. Features a super-high-res (16-bit) 4-voice music mode never heard before in any Atari game.
REQUIRES: One Joystick
#AP137 $15.95

NEW!

LORD OF THE ORB

by Jose Suarez
Written in machine language
Explore the three vertically scrolling levels of evil warlock Kyalramoell's castle. Recover the nine treasures he stole from the good kingdom of Boelinus, and rescue the Living Orb of Fortune. Destroy foul creatures from the Land of Nightmares with your glowing darts, gain strength from the gold coins and diamond rings scattered about the castle corridors. LORD OF THE ORB is destined to be one of 1985's classic hits!
REQUIRES: One Joystick #AP103 $15.95

Lord of the Orb

NEW!

MARS MISSION II

by Greg Christensen
Written in machine language
If you want to explore life beyond CAVERNS OF MARS, the MARS MISSION II is for you. In this sequel, you've made it past the vertical caverns and you're flying an envoy of ambassadors from Earth into the Martian City. All of a sudden, you're attacked by those Martian baddies and . . . you guessed it, the fighting starts all over again. But this time, things are totally different as you must dodge fields of flying boulders, missile launchers, and other deadly threats. You've got to get past all the levels and make it back to your base! Greg Christensen became the Atari Program Exchange's most successful author with CAVERNS OF MARS; find out why the MARS MISSION II is even better.
REQUIRES: One Joystick #AP120 $15.95

FREE DISK OFFER

BUY ANY 4 DISKS and CHOOSE 1 FREE PUBLIC DOMAIN DISK.

Saratoga

SARATOGA

Atari APX Award Winner

by Paul Wehner
Written in machine language
Great wars make great games, and if you enjoyed EASTERN FRONT you'll love SARATOGA—*the* war simulation of the American Revolution. The time is 1777 and your American forces *must* destroy the redcoats before the year ends, yet retain control of Albany, Philadelphia, West Point and Fort Ticonderoga. Eight scenarios and game-save feature make this simulation a lasting hit!
REQUIRES: One Joystick
#AP104 $15.95

BUMPOMOV'S DOGS

by Gray Chang
Written in machine language
You can't keep a good dog down, and Gray Chang, author of DOG DAZE DELUXE, now presents you with this totally new two-player competition. The race is on to see how many biscuits your two dogs can scoop up. The first dog that picks up 100 biscuits and carries them back to his doghouse wins. Beware the floating bone; if one dog shoots this at his opponent, the stricken canine gets rudely "bumped" through the maze and loses his biscuits. You'll find the splitting/recombining screen unique — making the action very exciting.
REQUIRES: One Joystick per person
#AP112 $12.95

BURGERS!

by Douglas Crockford
Written in Written in machine language
BURGERS! would terrify even easygoing Wimpy away from his favorite food! As you float above earth, burgers drift gently upward and if they touch you, you get bigger and bigger till you EXPLODE! Designed for young children, the score is totaled as "burgers served" and the music is light and spritely, (despite the grisly premise).
REQUIRES: One Joystick or Paddle Controllers
#AP109 $12.95

DANDY

by John Palevich
Written in machine language
DANDY is a 26 level dungeon adventure where cooperation is essential to success. You and up to 3 friends must get past the monsters. Strength is lost each time a monster rams you, and a constant supply of food is necessary to rebuild your wasted body. Collect smart bombs along the way (they come in handy) and don't forget to pick up keys to unlock your way out of each maze. DANDY is well-suited for group game play — families will be totally captivated, if not completely addicted.
REQUIRES: One Joystick per player #AP116 $15.95

Dandy

ANTIC PUBLIC DOMAIN LIBRARY

There's a treasury of Public Domain software for Atari computers. And the Antic Public Domain Library supports all Atari owners, users groups, and bulletin board sysops by making available an ever-growing catalog of the highest quality PD programs for everybody to share.

All programs in this series are sold as is. There's no documentation included, except what's built into the programs, Therefore, you may need some expertise in order to use the products properly . . . and there may be some programming quirks you'll need to modify for your individual hardware system. However, all products have been tested at Antic and will perform. Due to unforeseen circumstances, contents may vary slightly from the descriptions here. But each disk is filled with proven useful programs.

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Featuring sophisticated simulation games and text adventures. Seven top games including Titan, Horserace, Dungeon, Tiger and Hurricane.
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Seagames and More

Oceangoing arcade action with Jellyfish and Convoy. Also mystery fun with Sherlock, Sabotage and Quest. Relax from the dangers with Miniature Golf.
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Nine Big Games

Antic games disk #10 includes 9 new games, most of which have never appeared in public domain before. Computer Backgammon, banana-grabbing monkeys, Environment X, Mad Masons and more.
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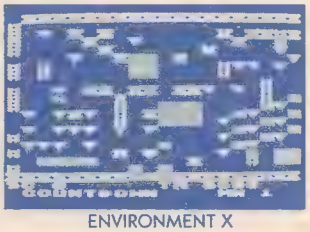

ENVIRONMENT X

Dozen Top Games

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Frog: another Ockers classic. Arcade action galore with Tank Battle, Speed Demon, Collisi, Petals, Draw and more.
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More Games Greats

Bats: yet another Ockers masterpiece. Couch: analyze yourself. Steller Defense: zap the aliens. MasterBrain: famed logic game. Hammurabi: classic simulation of ancient rule. Slalom, AceyDucy and more.
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Four huge all-text adventures. An amazing value for fantasy puzzle-solvers. Enter into a jungle mystery and a deadly treasure hunt. Become the captain of a doomed ocean liner . . . or wake up as a superhuman monster.
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Lunar Lander: new improved version. Plus more lunar action with Moon Base, Gravity, Defense. Talking Wumpus: text adventure upgraded for S.A.M. speech synthesizer. Pig, Fish: arcade menagerie.
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Packed with 13 hot new public domain games. Puzzle games include Boggler, Cubes and Tic1. Plus Pinball, Dark Tower, Meteor, Outpost and War.
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Two BIG games that take up a whole disk. Herbie: 4 levels of screen action. Smokie: graphics and text role-playing simulation of a favorite good ol' movie.
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Vultures plus Castle Hexagon —2 of the best action games from Stan Ockers, the king of public domain. The rest of the disk is a large scale text adventure that you can play or modify to create your own games.
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Fast Fun #2

More speedy machine language action games. Three highly professional games that fill all but 6 disk sectors. Erg and Diamond by assembler whiz Len Dorfman, plus Tricky.
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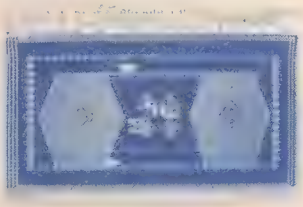

DIAMOND

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Seven more all-new action games submitted to Antic and never before in PD. Space Limbo: invaders with a twist. Bay Pilot: sail the world for treasure. Spook Busters: hit movie excitement. Typo Time: typing drill game. Also —Taxman, Hats, AntiPong.
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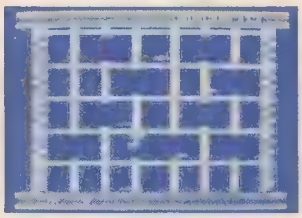

SMUSH

Antic Exclusives

Never before seen on the public domain circuit! Nine games that all came from direct submissions to Antic. Calamity, Grid Master, Jeopardy, Decode, Jump King, Digger, Slammer, Roni's TV, Hidden Meanings.
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All fast machine language action games. Much smoother and more challenging than BASIC games. Creepshow and Blackhole: 2 pinball boards. Whirly-Flyer: exciting chopper action. Passionately: graphics/music demo by Price & Gilbertson.
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APPLICATIONS

Photo Graphics

Demonstration collection of outstanding digitized photos.
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Photo Graphics

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Bubble Sort: data controller. TYPO: original Antic listing proofreader. Home Inventory. Renumber: BASIC line number changes. Compare: listings difference checker. Modem: telecommunications software.
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Plenty of Beatles classics like Yellow Submarine and In My Life, plus Star Trek, Ragtime selections and more. Requires Music Composer cartridge.
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Crockford's INTERVAL

Graphics Galore

Spider coloring program. Lots of colorful demonstration graphics, including the Atari Logo, Rainbow, Spiral and more.
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Sound & Graphics

Music and drawing application programs. Baby Pro Sound, Tune Rite, Etch Sketch and more.
#PD016 $10.00

Computer Tutor

Eight learning games for youngsters. Barnyard: a mystery. MathWars: arithmetic action. Concentration: general knowledge. FrenchGame: translation flashcards. Quiz: giant multi-purpose test program.
#PD023 $10.00

PICK OF THE MONTH

Crockford's Whimsy

Douglas Crockford (Galahad & the Holy Grail, Burgers) is now at Lucasfilm after a brilliant stint at Atari labs. This disk contains mind-boggling graphic demos of a super-real bouncing ball and an endless 3-D maze. Also a terrific musical ear training drill.
#PD033 $10.00

Antic Forth

Double-sided disk with powerful FIG-Forth language and editor, backed with on-disk tutorial.
#PD020 $10.00

Super Utilities #3

Disassembler: ML analysis. Tiny Text: word processor. GTIA Text Window. Label Printer: for Epson. RT Clock: real timing.
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APPLICATIONS

Musical Hits

Two music creation utilities: Does NOT require Music cartridge. Features Star Wars and other famed themes—M.A.S.H., Happy Days, Young & The Restless and more.
#PD014 $10.00

Super Utilities #1

Microassembler: USR routines, assembler. Doc: disk documenter. Num: automatic line numbers. Printnop: connect parallel printer to ports 3 & 4. Memtest: memory tester.
#PD010 $10.00

The Fix XL

Seek no further if you've been trying to find the Atari Translator Disk so you can run early software on your XL model computer. FIX XL is the easiest and most powerful translation software around, better than the factory original.
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Featuring latest improved AMODEM w/phone directory and autodialer. Tscope for Compuserve SIG*Atari downloading & online graphics. Plus Disk O'Link, a Mac-like bit-mapped terminal program written in C. 850 interface version.
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THE PAPIE DISKS

Climb into the hacker's attic and discover the arcane secrets of Atari professional programmers!

In the early days of Atari, top professional freelance programmers banded together to trade their secrets. Organized by the prolific Jerry White, the group called itself the Professional Atari Programmer's Information Exchange (PAPIE).

The PAPIE roster reads like a Who's Who of Atari programmers. A sampling includes Russ Wetmore, author of "Preppie I & II," Clinton Parker, creator of ACTION!, Jim Nangano, "Flip & Flop" and "Spy vs Spy," and Sheldon Leemon, creator of "Instedit."

Each member contributed their own private programming utilities and favorite programs, which were compiled on disk by Jerry White under the contributor's name and program number (i.e. Wetmore's 3rd program would be WETMORE3). Some of these professionals are now willing to share them with **Antic**'s readers, so we are offering them as a kind of "hacker's delight."

Most PAPIE programs are utilities that help solve advanced programming problems. And there are a good deal of assembly language routines intended to be incorporated into larger programs. In some cases there is documentation, but mostly there is none. Get the whole set and explore how the pros program!

EACH DISK IS GUARANTEED TO BE MORE THAN 95% PACKED!

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Stuart Smith
Fred Tedsen
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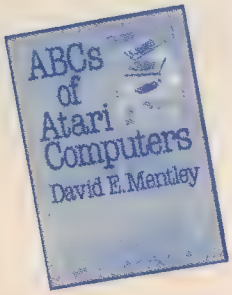

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From ABSolute to XMODEM, this 228-page encyclopedia of Atari lore puts thousands of vital facts at your fingertips. Jampacked with valuable short programs too. A superb microcomputer reference source for both beginners and advanced users.

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Antic Contributing Editor

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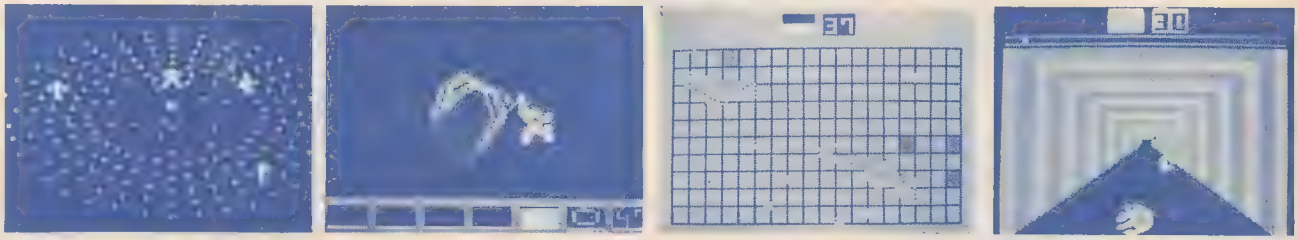

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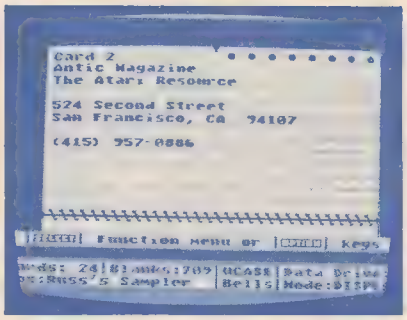

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NEW CUSTOMER SERVICE TEAM

Meet Brad Kershaw and Lisa Wehrer, Antic Arcade Catalog's new Customer Service Team. Brad handles technical problems. He's been an Atari programmer for five years, has a computer science degree and plenty of experience in computer retailing. Questions about orders are taken care of by Lisa, a customer service specialist for ten years.

Now if you have any problems with your Catalog orders or products, you can phone Antic Customer Service (415) 957-0886 between 9 a.m. and 1 p.m. Pacific Time, Monday through Thursday. Brad or Lisa will solve your problem. (So please don't phone the 800 # operators if you need help.)

You can also write to the Antic Customer Service Department at 524 Second Street, San Francisco, CA 94107.

CompuServe members can get fast, convenient service by leaving a message on the ANTIC ONLINE Product Information Section. Just type GO ANTIC when you log onto CompuServe and then select number 2 from the ANTIC ONLINE Main Menu. Your Customer Service feedback will be downloaded daily and Brad or Lisa will respond by electronic mail.

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TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
0123456789
```

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below. (Squares are drawn around the normal video characters so you can see their positions more accurately, these squares will not appear in listings.)

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
♥	CTRL ,	●	CTRL T
▶	CTRL A	■	CTRL U
▌	CTRL B	▐	CTRL V
◢	CTRL C	▼	CTRL W
◀	CTRL D	▲	CTRL X
◥	CTRL E	▐	CTRL Y
◤	CTRL F	◣	CTRL Z
◣	CTRL G	◥	ESC ESC
◢	CTRL H	↑	ESC CTRL -
◗	CTRL I	↓	ESC CTRL =
◣	CTRL J	←	ESC CTRL +
◗	CTRL K	→	ESC CTRL *
▖	CTRL L	●	CTRL .
▬	CTRL M	♠	CTRL ;
▬	CTRL N	▌	SHIFT =
▖	CTRL O	↖	ESC
♣	CTRL P		SHIFT
◤	CTRL Q		CLEAR
▬	CTRL R	◀	ESC DELETE
✚	CTRL S	▶	ESC TAB

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
♥	⅄CTRL ,	◨	⅄CTRL Y
▶	⅄CTRL A	◣	⅄CTRL Z
▌	⅄CTRL B	↑	ESC
◢	⅄CTRL C		SHIFT
◀	⅄CTRL D		DELETE
◥	⅄CTRL E	↓	ESC
◤	⅄CTRL F		SHIFT
◣	⅄CTRL G		INSERT
◢	⅄CTRL H	←	ESC
◗	⅄CTRL I		CTRL
◣	⅄CTRL J		TAB
◗	⅄CTRL K	→	ESC
◗	⅄CTRL L		SHIFT
▬	⅄CTRL M		TAB
▬	⅄CTRL N	♠	⅄CTRL .
▖	⅄CTRL O	♠	⅄CTRL ;
♣	⅄CTRL P	▌	⅄SHIFT =
◤	⅄CTRL Q	↖	ESC CTRL 2
▬	⅄CTRL R	◀	ESC
✚	⅄CTRL S		CTRL
●	⅄CTRL T		DELETE
▬	⅄CTRL U	▶	ESC
▌	⅄CTRL V		CTRL
▼	⅄CTRL W		INSERT
▲	⅄CTRL X		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key ◢◤. Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key ⅄ instead.) Note: In the printed listings, inverse characters will be slightly smaller than the normal ones.

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be *thicker* than the alpha-numerics. Compare the two sets of characters below:

SPECIAL	STANDARD
◢◤ CTRL F	◢◤ /
◣◥ CTRL G	◣◥ SHIFT +
▬ CTRL N	▬ SHIFT -
▬ CTRL R	▬ -
✚ CTRL S	✚ +

HOW TO USE TYPO II

Type in TYPO II and SAVE a copy to disk or cassette.

Type GOTO 32000 and follow TYPO II onscreen instructions. If the resulting two-letter line codes are not exactly the same as those in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME" [RETURN] (Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Owners of the BASIC XL cartridge from O.S.S. type SET 5,0 and SET 12,0 before using TYPO II.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "ß":POSITION 11,1:? "TYPO II "
EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
```

Don't type the TYPO II Codes!

```
ET 32120 ? "ß":POSITION 11,1:? "TYPO II
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press RETURN and edit line a
   bove.":GOTO 32050
```

ERROR FILE

KWIK DUMP

March 1985

The last number in line 1070 should be 27 instead of zero.

WIDE TEXT

January 1985

Substitute the following lines to print wide Z's.
In assembly:

```
0600      CPY #27*
8    ;8 BYTES TO A
 LETTER
```

In BASIC:

```
CT 20130 DATA 216
,208,213,185,0,22
4
```

S.A.M. SOURCE CODE

February 1985

In line 900 of the source code, LDY $01 should be changed to LDY #01.

KOOKY'S QUEST

February '85

The following line is missing:

2100 FOR S=32 TO 16 STEP −4: SOUND 0,S,14,10: EA=EA *EA*EA: SOUND 0,0,0,0: EA=1 /\0:NEXT S

BUS OVERLINES

Some signals and address labels were printed without overlines in Part III of Earl Rice's Parallel Bus Revealed" (Antic, March 1985).

These are the correct labels:

D8XX−DFXX
CS (CHIP RESET)
R/W
D1XX
RDE (READ DATA ENABLE)
DS (DATA STROBE)
DRST (DEVICE RESET)

ADVENT X-5

November '84

Missing line: 8020 RUN. Also, cassette owners should change the 138 in line 4005 to 130. The TYPO II code for line 1005 is EJ.

ADVENTURE ISLAND

November '84

Line 837 is missing its last item of data, a 4. Also, it will not run with DOS XL.

TYPO II UPDATE

Since **Antic** began using the improved TYPO II proofreading program in January 1985, we have been getting letters asking for TYPO II codes to some of the most popular pre-1985 programs.

Below you'll find the line-by-line codes—just the codes—for "Biffdrop" (December, 1984), "Escape from Epsilon" (April, 1984), "Advent X-5" (November, 1984) and "Adventure Island" (November, 1984). We'll print additional TYPO II updates if we get enough requests. Enjoy.

ESCAPE FROM EPSILON

```
NG 10
BL 20
RH 30
ND 40
AK 100
DQ 105
UQ 110
ZY 115
CV 120
VY 125
LK 130
RI 135
NG 140
OR 145
NK 150
YJ 155
KB 160
YO 165
YA 170
ZU 175
MV 180

FF 200
JZ 202
ZK 204
WB 210
JL 212
ZM 214
WM 220
ZI 222
CI 300
LG 305
AD 310
UI 325
KM 330
OR 335
JN 350
CX 355
LU 360
DJ 375
WG 380
IM 400
PH 450

SX 455
VC 460
VV 465
MW 470
US 500
CZ 505
MF 510
JO 550
PX 555
DT 560
SV 565
YE 570
OK 575
ZI 580
YU 585
UP 600
IP 601
RY 602
JJ 603
PA 604
WZ 605

MG 606
LN 607
KH 611
RX 612
ID 613
MQ 615
RA 616
CQ 617
JJ 620
BA 621
AD 622
UB 630
PO 631
LL 632
GN 633
BU 635
PP 636
OQ 637
HZ 640
OG 641
DY 642

FS 645
HH 646
GG 650
DC 651
PN 652
LX 655
HS 656
TV 657
TI 658
CS 659
WE 660
TT 661
EF 662
LA 663
XE 664
DG 690
UA 691
GD 692
MV 693
WS 694
YI 700

UC 705
CV 710
HX 715
DC 720
UF 725
DJ 730
WP 800
ZT 805
JW 810
LW 850
UM 900
JO 905
GI 910
DT 915
WK 920
RL 925
ES 930
NQ 2000
QE 2005
ZE 2010
RY 2015

MB 3002
HS 3003
CP 3004
IA 3005
CX 3006
MR 3009
CG 3011
MI 3016
DS 3039
IA 3042
DM 3056
GM 3060
IZ 3076
CI 4007
JI 4008
HT 4009
IV 4012
JA 4014
IY 4015
JU 4022
MC 4025

LD 4030
KS 4034
IU 4041
OV 4050
LU 4057
MN 4063
NQ 4071
CE 4080
CN 5000
TS 5050
RD 5100
NQ 5103
OK 5107
JF 5150
DL 5163
CQ 6001
ZK 6002
JF 6003
BV 6004
IU 6005
```

ADVENT X-5

```
XC 1
DY 2
OK 3
WH 5
CE 10
ZJ 15
LP 20
UD 25
PN 30
BR 50
NQ 55
ZW 60
CO 100
CV 105
ZO 110
QR 112
HM 115
FL 117
HW 120
HK 125
WT 126
LC 130
GB 145
TF 147
HN 150
LL 154
RT 155
RD 160
EO 165
BW 170
KH 175

CV 180
TZ 185
CV 190
DY 200
YN 205
LX 210
YT 215
HZ 220
CP 225
KP 230
BH 240
CW 250
SQ 255
HF 260
UT 265
GL 270
DQ 275
UT 280
AQ 285
LB 290
HK 300
XK 301
HU 350
GZ 352
LI 355
MF 357
RL 360
WS 365
JN 367
WA 370
PT 375

XW 380
SC 381
WF 382
PB 383
KJ 384
HH 390
TM 392
UF 393
RO 399
TZ 400
LY 405
FG 410
YV 415
CD 420
RU 450
LW 455
LU 460
YJ 500
JL 502
YS 505
AW 507
WS 510
JL 517
WO 522
OX 525
UW 526
HE 527
NR 530
HA 535
BZ 545
AS 550

UK 555
QM 600
MU 605
RH 649
EB 650
ZU 700
TF 705
XE 710
PH 715
ZH 720
LU 725
ES 730
ZX 750
LT 755
GW 775
WW 780
CJ 785
ZJ 800
AM 805
RR 810
YT 815
QQ 820
YF 825
CE 830
UZ 835
PF 840
CJ 845
IW 850
FX 855
XL 860
OH 865
QD 900

VY 905
SB 1000
EJ 1005
HX 1010
VD 1015
GN 1020
JE 1025
SC 1030
CP 1035
PO 1100
WJ 1105
HD 2000
BS 2005
HM 3000
JH 3005
BB 4000
IK 4005
WF 4010
BB 5000
KB 8000
SC 8010
MZ 8020
PZ 9001
WY 9002
LW 9003
WC 9004
VK 9005
LC 9006
AK 9007
HU 9008
IO 9009
TZ 9010

IT 9011
MW 9012
LW 9013
NP 9014
KK 9015
FS 9016
VI 9017
ZV 9018
XV 9019
RN 9020
XY 9021
RL 9022
GM 9023
JV 9024
IO 9025
XE 9026
XK 9027
TU 9028
IW 9029
MJ 9030
GO 9031
JJ 9032
JO 9033
PJ 9034
AN 9035
YZ 9036
EJ 9037
MB 9038
WD 9039
AI 9581
SV 9502
WX 9503

SS 9504
DD 9505
ZX 9506
PE 9507
UH 9508
PE 9509
OP 9510
TH 9511
FH 9512
BW 9513
GK 9514
SC 9515
IL 9516
WU 9517
BR 9518
MH 9519
GA 9520
SY 9521
WL 9522
IS 9523
WG 9524
IK 9525
VJ 9526
AO 9527
DY 9528
WV 9529
ZA 9530
HJ 9531
YK 9532
OC 9533
PB 9534
SF 9535

FY 9536
AC 9537
GR 9538
II 9539
VV 9540
IA 9541
OL 9542
CX 9543
DB 9544
DF 9545
DJ 9546
GZ 9547
HD 9548
HH 9549
GA 9550
GE 9551
GI 9552
VM 9553
VO 9554
VU 9555
VY 9556
WC 9557
WG 9558
HO 9559
GH 9560
PL 9561
BM 9562
ME 9997
ZU 9998
YC 9999
VM 10000
PI 15000
```

ADVENTURE ISLAND

```
OO 0
VK 1
BH 2
ON 3
QO 4
OO 5
ZL 6
XF 7
TB 8
TS 10
QY 12
OR 13
JU 14
MI 15
LJ 16
UY 17
TE 18
RT 19
RR 20
FQ 40
XO 59
RV 64
AE 65
EW 66
SM 90
PF 91
UV 92
RU 93
KP 94
FR 95
PW 96
FJ 97
FH 98
JJ 99
NB 100
ZF 101
OD 102
GV 103
YV 104
RE 106
AQ 108
JG 109
GZ 110
NX 111
IR 120
YU 121
YT 122
GY 125
DC 126
BH 127
AW 130
WH 149
DP 150
WO 151
RA 153
VP 154
AQ 155
XV 199
TJ 200
OO 201
AR 205
HT 206
UU 207
VK 208
CL 209
YD 210
FT 211
LC 213
LD 270
AA 271
IT 272
BO 277
OV 278
RL 279
DD 280
YU 281
NA 283
AC 285
OX 300
OC 305
VL 310
ZQ 315
FK 340
PB 341
TM 342
RQ 344
IJ 346
VJ 348
TD 349
CS 350
MN 352
ZS 353
XV 360
LL 362
YB 363
DP 366
RP 367
CV 369
GP 370
KU 371
GL 372
ET 373
GP 374
BW 375
UA 376
NW 377
JC 378
BX 379
ZU 380
SB 400
BI 402
FZ 403
JW 404
TX 405
AZ 406
ZV 407
ND 420
AA 421
OP 422
ZN 423
AP 430
XE 431
FD 432
XG 433
VI 434
FP 435
CF 436
YG 437
OV 438
RU 439
TE 440
HA 441
DI 442
IC 443
NK 444
ZF 445
SX 446
ZW 447
NM 448
BU 449
MK 450
NJ 452
PV 453
SB 454
MN 455
UE 457
QP 470
ID 472
VZ 473
AN 474
RY 475
NB 476
YN 477
GM 478
NP 479
MO 480
XW 481
ZW 482
SW 490
ZV 491
JD 500
UO 501
TV 502
TK 505
EX 506
ZW 507
VL 508
WM 509
KX 510
LY 511
CB 512
FW 513
AJ 514
HG 517
UO 518
VK 519
NH 520
ZI 521
WE 522
ZO 523
XG 524
ZU 525
RR 526
OV 530
ZL 532
EX 533
FQ 534
LJ 535
MX 536
QZ 537
OM 538
JN 539
FI 540
YB 541
VN 542
JZ 543
RF 544
FS 545
AE 547
LA 560
OF 562
AE 563
QH 564
NO 565
RG 566
TA 567
LI 568
HV 569
GK 570
RY 571
ND 572
ZY 573
RC 580
MF 581
IX 582
GD 583
XH 584
IF 585
TM 586
EU 587
HL 588
RV 589
GK 590
CD 591
VR 592
WC 594
AL 596
LK 601
GU 602
UA 603
AO 614
AA 615
JA 617
SR 620
HE 621
MF 624
ZV 625
DF 627
AE 628
TR 629
MN 630
SR 640
TE 641
NX 660
EX 661
HX 662
SJ 663
HY 664
CK 665
CG 666
AJ 667
FD 670
XQ 671
VX 672
EC 673
WX 674
ZZ 675
AZ 676
AO 678
NI 680
YM 681
HR 682
FI 683
GB 684
QJ 685
NI 686
TU 687
QD 688
ZP 689
CD 690
DS 691
FU 692
ST 697
FC 698
TG 699
NB 750
UI 751
KY 752
KE 753
HP 754
JB 757
YJ 759
JX 761
YV 762
LK 763
AB 764
DE 801
AV 802
FP 803
WR 804
CZ 805
QL 806
MC 807
RF 808
BZ 809
EE 810
VU 811
BA 812
GG 813
AK 814
UK 815
NE 816
AZ 817
OI 818
IA 819
IZ 820
SE 821
BZ 822
UT 823
JV 824
VE 825
MC 826
XA 827
RJ 828
QE 829
QP 830
KX 831
EU 832
RV 833
WB 834
YB 835
ZF 836
HF 837
NS 838
AE 844
TR 901
NR 902
BN 903
XR 904
YW 905
RQ 906
AZ 907
MC 908
CK 909
TI 910
HH 911
GU 912
RL 913
LU 914
BO 915
NQ 916
LO 917
LF 918
CZ 919
EK 920
PI 921
QL 922
OZ 923
TN 924
PJ 925
PA 926
AV 927
ZK 928
NU 929
FF 930
PD 931
MK 932
PH 933
ZP 934
AV 935
RQ 936
OS 937
BY 938
QL 939
NP 940
AU 941
OF 942
MJ 943
RX 945
DY 946
RX 947
UE 948
EL 949
KD 950
OP 951
SK 952
LH 953
TI 954
XJ 955
MA 956
UF 957
GT 958
MZ 959
QR 960
DS 961
TG 962
UJ 963
CH 964
IJ 965
EN 966
PY 967
XP 968
OH 969
PN 970
MD 971
TX 972
VH 999
TI 1000
WF 1001
UH 1002
GR 1008
AO 1050
RW 1100
FN 1105
IX 1106
XL 1109
NU 1110
LH 1111
VY 1112
IT 1113
OB 1114
UX 1115
AB 1118
VX 1119
EO 1120
VQ 1130
CM 1199
OD 1200
GQ 1205
KI 1206
XN 1209
OR 1210
LJ 1211
XK 1212
ZX 1213
RB 1214
KO 1216
EQ 1219
CO 1299
YH 1300
SH 1301
MB 1303
TU 1304
AH 1600
PY 1610
CY 1620
YW 1635
OB 1639
YY 1640
BR 1645
LZ 1649
VJ 1650
MB 1660
HX 1661
HC 1800
SF 1810
RJ 1820
ZA 1835
QF 1839
MN 1840
BV 1845
MD 1849
EY 1850
ZY 2000
KF 2002
HI 2004
FK 2006
AP 2050
IB 2100
SD 2101
RA 2110
LA 2120
YN 2135
HS 2140
SQ 2141
BI 2145
LQ 2149
DE 2150
WS 2200
XD 2210
WD 2220
YP 2235
ZR 2239
XM 2240
BK 2245
LS 2249
XY 2250
QF 2900
ZS 2904
AY 2905
TK 2906
SZ 2907
RZ 2908
UN 2909
HR 2911
FR 2912
YO 2914
OI 2920
VA 2921
OO 2924
JX 2925
OM 2926
EJ 2927
XK 2929
ZH 2930
XI 2950
BL 2951
ZR 3000
ID 10513
TE 10612
RG 10613
JE 10614
YR 10711
PU 10712
CZ 10713
OH 10714
EB 10715
IL 10720
OH 10721
VI 10808
FI 10809
SO 10810
YV 10811
CJ 10812
IP 10813
MJ 10814
UQ 10815
YC 10816
FQ 10820
DG 10821
AM 10822
GB 10908
OV 10909
UC 10910
AL 10911
YU 10912
ZX 10913
UZ 10914
IL 10915
ZB 10916
RY 10920
XX 10921
NC 10922
XG 11008
VF 11009
LR 11010
NU 11011
WV 11012
ZN 11013
YD 11014
MC 11015
KL 11016
DW 11017
NC 11018
LF 11019
JX 11020
MH 11106
LX 11107
SU 11108
GO 11109
AH 11110
JT 11112
HN 11113
JK 11114
PJ 11116
LE 11117
SD 11118
NZ 11119
UM 11120
PJ 11121
YG 11205
KK 11206
OR 11207
IX 11208
YL 11209
VP 11210
ZS 11211
IR 11212
HT 11213
IQ 11214
LT 11215
BZ 11216
CU 11217
VD 11218
CT 11219
AE 11220
GY 11221
GO 11302
JJ 11303
KE 11304
IR 11305
RV 11306
NY 11307
ON 11308
ZQ 11309
LG 11310
UV 11312
FM 11313
TX 11314
KG 11315
OP 11316
KC 11317
WS 11318
WN 11319
JB 11320
TF 11321
JN 11402
PI 11403
PN 11404
RK 11405
CK 11406
BK 11407
RV 11408
GD 11409
OM 11410
RW 11413
RJ 11414
DZ 11415
HN 11416
BE 11417
DE 11418
IQ 11419
CY 11420
DT 11421
TO 11502
WJ 11503
AI 11504
WA 11505
YP 11506
CL 11507
RT 11508
ZS 11509
SY 11510
JD 11511
SI 11512
OO 11513
WW 11514
UD 11515
OV 11516
HX 11518
BG 11519
MP 11520
QU 11607
LV 11608
LD 11609
KM 11610
HD 11611
LY 11612
HC 11613
JM 11614
XM 11615
RR 11616
LG 11709
KL 11710
GF 11711
TI 11712
WC 11713
QA 11714
SZ 11715
YR 11716
RH 11809
OK 11810
DN 11811
TY 11812
BS 11813
TC 11814
GZ 11815
BX 11816
DL 11909
TV 11910
XP 11911
DR 11912
ZL 11913
YL 11914
NF 11915
PR 11916
AB 12010
GK 12012
BM 12013
SR 12014
QZ 12015
NT 12016
XA 12112
DL 12113
LK 12114
ZE 12115
NV 12116
```

BIFFDROP

```
BF 1      MX 205    KM 355    KD 530    UM 614    KP 4001   ZW 10003  OZ 10043
DY 2      PJ 210    KA 360    JN 535    TL 615    JE 4002   QB 10009  OX 10049
QK 3      VN 215    QX 365    TT 550    IR 616    SB 4003   TT 10010  RC 10050
XI 5      YG 220    PV 370    CV 555    JF 618    CO 4004   PE 10011  KV 10051
CQ 100    QA 225    IL 400    EH 560    KF 620    YA 4005   SQ 10012  YX 10059
VH 105    VZ 230    FC 405    YG 565    CE 625    YA 4006   NM 10019  HS 10060
BA 110    UI 231    CB 410    BW 570    ED 675    DF 5050   PS 10020  PR 10061
XR 115    BC 232    LF 415    QP 575    ZB 680    EX 5055   BE 10021  GB 10062
RP 120    FF 233    LF 420    AV 580    SC 700    VQ 5075   HJ 10022  JQ 10063
BF 125    RA 234    HY 425    NT 585    JE 705    XA 5080   LS 10023  CO 10069
NM 130    RS 235    FW 430    WW 590    EA 710    RA 5090   UC 10029  GL 10070
QH 135    ZR 240    RU 435    CY 600    YI 800    EY 5091   HZ 10030  LZ 10071
PH 140    IP 245    KW 500    DF 605    IA 805    JN 6000   WR 10031  HW 10072
GZ 145    KJ 250    CC 505    ER 607    DZ 810    IR 6005   HN 10032  BO 10073
MM 150    NZ 255    MH 510    IS 610    SR 815    MM 9000   AC 10039  DB 10079
MT 155    HO 300    BQ 515    ZZ 611    EP 820    DN 10000  EM 10040  MC 19999
GN 160    UR 305    UC 520    BZ 612    OC 900    GL 10001  VY 10041
BQ 200    QV 350    BT 525    PW 613    IV 4000   AB 10002  LV 10042
```

TECH TIPS

REHABILITATING DISABLED [BREAK] KEY

Include this routine at the beginning of your next Autoboot BASIC program for an elegant method of selectively disabling the [BREAK] key.

When your program is booted normally, it will be safe from overly-curious or clumsy fingers. If you wish to modify the program, boot it while pressing the [SELECT] key and the [BREAK] key will be re-enabled.

Don't type the TYPO II Codes!

```
JS 1 BRK=1:IF PEEK(53279)=5 THEN BRK=0
VL 2 GOTO 10
VE 5 IF BRK THEN POKE 16,112:POKE 53774,1
   12:POKE 580,1
TA 10 REM START OF YOUR PROGRAM
LB 20 REM (USE 'GOSUB 5' TO DISABLE [BREA
   K] KEY)
```

RAMTOP RESET

Next time you alter RAMTOP (location 106) to make room for your own machine language routines, use the line below to make sure RAMTOP is reset to its original value.

```
POKE 106,PEEK(740):GRAPHICS 0
```

the 24 puzzle—can YOU program a solution?

SLIDE

Article on page 33.

LISTING 1

Don't type the TYPO II Codes!

```
UC 10 REM SLIDE
IE 20 REM BY MARK MOORE
FW 30 REM (c) 1985, ANTIC PUBLISHING
AZ 40 DIM N(30)
OU 50 GRAPHICS 0:SETCOLOR 2,7,0:SETCOLOR
   4,0,2:POKE 752,1
RG 60 POSITION 17,1:? "SLIDE":POSITION 13
   ,2:? "by Mark Moore":POSITION 6,18:? "
   Please Wait."
HQ 70 POSITION 2,4:POKE 82,12:?
MK 80 ? " ┌──────────┐"
AT 90 ? " ├┬┬┬┬┬┬┬┬┬┤"
VN 100 ? " │┼┼┼┼┼┼┼┼┼┼│"
ZS 110 ? " ├┼┼┼┼┼┼┼┼┼┼┤"
TP 120 ? " │┼┼┼┼┼┼┼┼┼┼│    ┌─┐"
LF 130 ? " ├┼┼┼┼┼┼┼┼┼┼┤ YOU ARE ON ├┼┤"
CF 140 ? " │┼┼┼┼┼┼┼┼┼┼│    └─┘"
AA 150 ? " ├┼┼┼┼┼┼┼┼┼┼┤"
VZ 160 ? " │┼┼┼┼┼┼┼┼┼┼│"
AE 170 ? " ├┼┼┼┼┼┼┼┼┼┼┤"
```

```
OV 180 ? " ■■■
```

```
JH 1020 POSITION 1,4:? #6;"[INVERSE]WHO IS PLAYER
   1?"
ZH 1030 POSITION 5,5:? #6;"?":Y=5:GOSUB 1
   100
SB 1040 PLYR1$=NAME$(1,I-1)
NT 1050 POSITION 1,8:? #6;"[INVERSE]WHO IS PLAYER
   2?"
GW 1060 POSITION 5,9:? #6;"?":Y=9:GOSUB 1
   100
SU 1070 PLYR2$=NAME$(1,I-1)
UV 1080 TRAP 40000:RETURN
EP 1100 OPEN #1,4,0,"K:"
GR 1110 FOR I=1 TO 14:GET #1,A
NG 1120 IF A=155 THEN 1150
WP 1130 POSITION I+5,Y:PUT #6,A
HK 1140 NAME$(I,I)=CHR$(A):NEXT I
DS 1150 CLOSE #1:RETURN
HO 1500 GRAPHICS 0:POKE 752,1:POKE 708,88
   :POKE 710,18
UM 1510 DL=PEEK(560)+256*PEEK(561)
BB 1520 POKE DL+3,70:FOR I=6 TO 10:POKE D
   L+I,6:NEXT I
NP 1530 POSITION 1,0:? #6;PLYR1$:POSITION
    11,0:? #6;PLYR2$
YU 1540 POSITION 3,1:? #6;S(1):POSITION 1
   3,1:? #6;S(2)
MM 1550 SONG=INT(100*RND(0)):IF SONG<1 OR
    SONG>40 THEN 1550
YA 1560 IF DONE$(SONG,SONG)="1" THEN 1550
XQ 1570 CA=INT((SONG+9)/10):LN=3990+SONG*
   10
BG 1580 POSITION 20,2:? #6;"CATEGORY:";CA
   T$(11*CA-10,11*CA)
BK 1590 RETURN
JB 2000 OLDBID=11
KZ 2005 TRAP 40000:IF LAST=1 THEN WHO$=PL
   YR2$
QG 2010 IF LAST=2 THEN WHO$=PLYR1$
DM 2020 POSITION 2,6:? WHO$;", you can gu
   ess that song in":? "how many notes...
   "
YQ 2030 POSITION 20,7:INPUT BID$
UV 2035 IF BID$="0" THEN OB=2:GOTO 2071
GI 2036 IF BID$<"1" THEN 2040
TA 2037 IF LAST=2 THEN LAST=1:GOTO 2039
SN 2038 IF LAST=1 THEN LAST=2
AL 2039 BID$="P":OLDBID=1:POSITION 10,4:?
    "CURRENT BID = ";OLDBID;" "
EJ 2040 IF BID$="P" OR BID$="p" THEN 2110
KL 2050 TRAP 2070:NUBID=VAL(BID$)
FH 2060 IF NUBID<OLDBID AND NUBID>0 THEN
   2090
JF 2070 OB=OLDBID
QB 2071 GOSUB 800:? :? "MUST BE FROM 1 TO
    ";OB-1;", OR P TO PASS":FOR TIM=1 TO
   500:NEXT TIM
MK 2075 ? "↑Please try again.
          ":FOR TIM=1 TO 500:NEXT TIM
WJ 2077 ? "↑                    "
OA 2080 POSITION 20,7:? "      ":GOTO 2030
MB 2090 OLDBID=NUBID:LAST=1+(LAST=1):POSI
   TION 10,4:? "CURRENT BID = ";OLDBID;"
   "
QC 2100 POSITION 1,6:? BL$:? BL$:? BL$:?
   BL$:GOTO 2005
WP 2110 IF OLDBID=11 THEN OLDBID=10
AI 2120 RETURN
PI 2200 POSITION 1,6:? BL$:? BL$:? BL$:?
   BL$
PW 2210 IF LAST=1 THEN WHO$=PLYR1$
RR 2220 IF LAST=2 THEN WHO$=PLYR2$
CE 2230 POSITION 2,6:? "Okay, ";WHO$;", h
   ere are your ";OLDBID;" notes."
GR 2240 ? "For ";11-OLDBID;" point";:IF O
   LDBID<10 THEN ? "s";
KS 2245 ? ",  [INVERSE]GUESS THAT SONG!!!"
HZ 2250 FOR I=1 TO 300:NEXT I
AF 2260 GOSUB 2500
OU 2270 POSITION 2,10:? "Press A for answ
   er, N to play again"
ZM 2280 GOSUB 900
YN 2290 IF A=82 OR A=114 THEN 2260
LA 2300 IF A<>65 AND A<>97 THEN GOSUB 800
   :GOTO 2280
AJ 2310 RETURN
NJ 2500 RESTORE LN:READ TEMPO,PAUSE,P$,D$
   ,NAME$
ZE 2510 FOR I=1 TO OLDBID
UW 2520 FOR J=1 TO TEMPO*(ASC(D$(I,I))-64
   )
IK 2530 SOUND 0,ASC(P$(I,I)),10,8:NEXT J
GB 2540 FOR J=1 TO PAUSE:SOUND 0,0,0,0:NE
   XT J
NF 2550 NEXT I:SOUND 0,0,0,0:RETURN
RL 2800 POSITION 2,10:? "The title of thi
   s song is:          ":? :? NAME$
UH 2810 POSITION 2,15:? "Did ";WHO$;" get
    the title correct?"
ZG 2820 GOSUB 900
YH 2830 IF A=78 OR A=110 THEN 2900
PL 2840 IF A<>89 AND A<>121 THEN GOSUB 80
   0:? :? "  PRESS Y FOR YES OR N FOR NO"
   :GOTO 2820
NX 2850 FOR I=1 TO 11-OLDBID:S(LAST)=S(LA
   ST)+1:POSITION 3+(LAST=2)*10,1:? #6;S(
   LAST);" "
MD 2860 GOSUB 3100:NEXT I
OX 2870 DONE$(SONG,SONG)="1"
YR 2880 POSITION 2,15:? "Here are the fir
   st ten notes....      ":OLDBID=10:GOSUB
    2500
PC 2890 GOTO 3000
UW 2900 FOR I=1 TO OLDBID:S(LAST)=S(LAST)
   -1:POSITION 3+(LAST=2)*10,1:? #6;S(LAS
   T);" "
OT 2910 POKE 53279,1:FOR J=1 TO 20:NEXT J
   :NEXT I
BT 3000 POSITION 7,20:? "[INVERSE]PRESS ANY KEY T
   O CONTINUE"
JY 3010 GOSUB 900:RETURN
DO 3100 FOR J=8 TO 0 STEP -1:SOUND 0,53,1
   0,J:FOR K=1 TO 4:NEXT K:NEXT J:RETURN
AZ 3500 IF S(1)>=50 THEN WHO$=PLYR1$:GOTO
    3530
CT 3510 IF S(2)>=50 THEN WHO$=PLYR2$:GOTO
    3530
KU 3520 A=0:RETURN
KP 3530 GRAPHICS 18
DK 3540 POSITION 3,4:? #6;WHO$;" [INVERSE]WINS!!"
MB 3550 FOR I=40 TO 230:POKE 708,I:NEXT I
CS 3560 LN=5000:OLDBID=11:GOSUB 2500
FE 3570 POSITION 4,8:? #6;"[INVERSE]PLAY AGAIN?"
VE 3580 GOSUB 900:IF A=78 OR A=89 OR A=11
   0 OR A=121 THEN RETURN
TF 3600 POSITION 4,10:? #6;"PRESS Y OR N"
   :GOTO 3580
RJ 3999 REM SONG DATA
HR 4000 DATA 15,8,11y1[INVERSE] [INVERSE]YOY,AAABBBBABA,"
   Sunshine of Your Love"
WA 4010 DATA 18,4,[INVERSE]y[INVERSE]G[INVERSE],BAHABAIBAB,"
   Yellow Submarine"
HT 4020 DATA 16,4,[INVERSE]GG[INVERSE]rl◆[◆,AAHAAAAAAAB,"
   Yesterday"
DX 4030 DATA 6,5,y1f[flyFyF,CCOCCCBBPC,"T
   he Age of Aquarius"
VD 4040 DATA 16,3,◆◆eeeUQU◆e,DBACBCABHB,"
   Scarborough Fair"
BG 4050 DATA 13,4,◆U◆l◆◆U◆l[,AAAALAAACL,"
   California Dreaming"
XC 4060 DATA 4,6,[INVERSE]<eH[INVERSE]HQH,BFFCHBFFCH,"H
   appy Together"
TK 4070 DATA 25,4,[INVERSE]y◆He◆ye<Q,AAAAAAAAAA,"
   Stairway to Heaven"
OH 4080 DATA 12,6,[INVERSE]ffrf[yyf,CCFBABAHAB,"
   Close to You"
VE 4090 DATA 20,5,[INVERSE]yFy[QHH,AABBBACAAA,"
   Ebony and Ivory"
PN 4100 DATA 28,3,[INVERSE]yf[INVERSE]yf[INVERSE]yf[INVERSE],AAAAAAAAAA,"
   Moonlight Sonata"
MI 4110 DATA 21,4,[INVERSE]GFy[ly[lF,BBBAABAABB,"
   Pictures at an Exhibition"
SV 4120 DATA 12,4,<e<5<eH<<H,LAAAAAABAA,"
   Ravel's Bolero"
XJ 4130 DATA 20,7,[INVERSE]YY[INVERSE]HHUUY,AAAABABABA,"
   The Blue Danube"
PR 4140 DATA 6,5,[INVERSE]YY[INVERSE]GGGYYY,CCCMCCCLBB,"B
   eethoven's Fifth Symphony"
IJ 4150 DATA 20,3,[INVERSE]y[INVERSE]y[INVERSE]y[◆,AADAADAABC,"
```

```
   Brahms' Lullaby"
XK 4160 DATA 23,4,◆y1◆Q[[HQQ,AAAAAAAAAA,
   "Jesu Joy of Man's Desiring" (Bach)
XT 4170 DATA 20,3,◆U◆lr1■■r1,ABABAACAAB,"
   Carnival of Venice"
DY 4180 DATA 4,8,1111◆◆U1◆1,FAAAFFFFME,Ma
   rche Miniature from "The Nutcracker"
YT 4190 DATA 15,8,■■y1◤lr■r,AAAAAABAAB,"
   In the Hall of the Mountain King"
EC 4200 DATA 28,3,■yflyfylyl,AAAAAAAAAA,"
   The Godfather"
XC 4210 DATA 5,4,■■y1◆yyy1◆,DBDBGDZDBD,"A
   ll in the Family"
YH 4220 DATA 15,4,■◆r■■◆■■■H,BCAJBCAJBC,"
   Tara's Theme" (Gone With the Wind)
ZM 4230 DATA 15,5,[f1f1fly1y,BBACBBAGAA,"
   MASH" ("Suicide is Painless")
CD 4240 DATA 8,5,■■◆1r■H◆1r,DGGAAAGDAA,"S
   tar Wars"
WT 4250 DATA 14,4,QHQ[◆1y■■■,BBAAFAABBD,"
   The Sound of Music"
ZR 4260 DATA 12,4,■[■[■[[Q,AAABABAFAA,"
   The Sting"
MG 4270 DATA 6,28,■■y■■■■■,CCBBCCBBCC,"
   Mission Impossible"
NX 4280 DATA 10,5,■1r■■■◆◆L,CAFBAAAFAJ,"
   Star Trek"
FD 4290 DATA 10,5,D[flyy[[◆,MAAAAABBAA,"
   Oklahoma!"
ZQ 4300 DATA 10,7,◆◆◆[◆1y◆◆Q,CBABABAKAB,"
   Raindrops Keep Falling on My Head"
VS 4310 DATA 9,5,■■■■y◆1y■,BACCCFBACC,"T
   he Star-Spangled Banner"
BI 4320 DATA 14,3,1[QHeHQ◆y1,BDBCABDBCA,"
   Greensleeves"
MG 4330 DATA 10,5,■■ ■■■■■■■■,DCAAGABAAB,"
   Beer Barrel Polka"
BT 4340 DATA 11,5,1Q1■■◆1■1■,BBBBCAAABI,"
   How Much is That Doggy in the Window?"
YR 4350 DATA 30,3,■■■y■■■■■■■,AAAEAAABCA,"
   Autumn Leaves"
YL 4360 DATA 30,4,■◆1r◤■U■LU,AAAAAABAAA,"
   When You Wish Upon A Star"
DU 4370 DATA 21,4,■y1f■■1■ ■■,AAAAAFBFBH,"
   The Shadow of Your Smile"
HF 4380 DATA 13,4,■■y1■1[Qy[,DBBCADDBBH,"
   Anchors Aweigh"
MG 4390 DATA 3,8,y1◆[y■■■■1,BBBGGGDBDB,"S
   eventy-Six Trombones"
KG 5000 DATA 6,4,1r1■1◆[UQLH,DCABDBBBBBD,
   WINNER
```

FONTMAKER

See Help.

LISTING 1

Don't type the TYPO II Codes!

```
XW 10 REM GEMINI 10X FONT MAKER
KB 15 REM SG-10 MODIFICATION BY CHARLES J
   ACKSON
FV 20 REM (c) 1985, ANTIC PUBLISHING
JD 1700 D=PEEK(CHORG+10*(C-32)):B$(18,18)
   =CHR$(7):IF D=0 THEN B$(18,18)=CHR$(8)
VS 1702 FOR I=1 TO 9:TMP=USR(ADR(B$),(PEE
   K(CHORG+10*(C-32)+I))):T(I)=TMP:NEXT I
ZT 1720 PRINT #4;E$;CHR$(42);CHR$(1);CHR$
   (C);CHR$(C);CHR$(9+128*(D=0));
OU 1730 PRINT #4;"♥";CHR$(T(1));CHR$(T(2)
   );CHR$(T(3));CHR$(T(4));
PG 1735 PRINT #4;CHR$(T(5));CHR$(T(6));CH
   R$(T(7));CHR$(T(8));CHR$(T(9));"♥";
EF 2315 DIM B$(27):B$="hhh■■)♥■♥◣┴F■i♥N○◢
   ■■■■♥■H◆"
IY 2590 POSITION 11,0:? "■G■10 FONT MAKER
   ":POSITION 15,1:? "by James Duffin"
SI 2710 ? :? "The ■G■10 FONT MAKER":? "
            by JAMES DUFFIN":? "   is a
    program which allows you to"
```

CRYPTOQUOTES

Article on page 21.

LISTING 1

Don't type the TYPO II Codes!

```
ZG 10 REM CRYPTO QUOTES
CH 20 REM BY MIKE FLEISCHMANN
FW 30 REM (c) 1985, ANTIC PUBLISHING
ML 90 DIM A$(320),B$(320),CH1$(3),CH2$(1)
   ,ALPH$(26),C$(320)
RL 100 GRAPHICS 0:? ,"■CRYPTO■QUOTES■":?
FK 105 ? "INPUT YOUR STRING:"
ZJ 110 INPUT A$
IS 140 REM If your string is too long for
    A$, continue it in B$, below.
FE 160 ? :? "INPUT THE REST OF YOUR STRIN
   G":? " or press [RETURN]."
WL 170 INPUT B$:IF LEN(B$)<1 THEN C$=A$:G
   OTO 190
FT 180 C$(1,LEN(A$))=A$:C$(LEN(A$)+1,LEN(
   A$)+1)=" ":C$(LEN(A$)+2)=B$:A$=C$
YH 190 FOR I=1 TO LEN(C$):KK=ASC(C$(I,I))
   :IF KK=32 THEN 210
GM 200 IF KK<65 OR KK>90 THEN POP :POSITI
   ON 7,10:? "■UPPER■CASE■LETTERS■ONLY■"
   ;:FOR KK=1 TO 300:NEXT KK:GOTO 10
FU 210 NEXT I
```

continued on next page

```
HS 220 FOR I=1 TO LEN(C$):C$(I,I)=CHR$(AS
   C(C$(I,I))+128):NEXT I
ZM 230 FOR I=1 TO 320:B$(I)=" ":NEXT I
QS 240 GRAPHICS 0:? ,"■CRYPTO■QUOTES■":GO
   SUB 10090:REM FIGURE OUT STRING BREAK
   POSITIONS
DF 250 ALPH$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"

HB 260 GOSUB 1050:REM PRINT CRYPTO STRING

DP 270 GOSUB 2050:REM PRINT REPLACEMENT S
   TRING
DZ 280 POSITION 6,10:? ALPH$:? :? "  Type
    in the letter you want to "
PP 290 ? " change and then the letter you
    "
EC 300 ? " think it should be."
NX 305 ? :? "(For example, typing  W S  c
   hanges all W's to S's.)"
QU 310 ? :? " IF W= # GUESSES WILL BE ERA
   SED"
FW 320 ? " IF W= @ START OVER"
WO 330 ? " IF W= X END PROGRAM":PRINT "
                        ":POSITION 3,22
ZF 340 INPUT CH1$:IF LEN(CH1$)<1 THEN 240

ZC 341 FOR X=1 TO LEN(CH1$):KK=ASC(CH1$(X
   ,X))
VD 342 IF (KK>64 AND KK<91) THEN 340
HE 343 IF KK=32 OR KK=35 OR KK=37 OR KK=6
   4 THEN 340
PH 344 POP :POSITION 7,6:? "■UPPERCASE■ L
   ETTERS■ONLY■";:FOR KK=1 TO 150:NEXT KK

ON 347 GOTO 240
MT 348 NEXT X
NA 350 IF CH1$="#" THEN 230
XS 360 IF CH1$="@" THEN A$="":GOTO 100
PB 370 IF CH1$="X" THEN 420
TK 380 IF LEN(CH1$)<3 THEN CH2$=" ":CH1$=
   CH1$(1,1):GOTO 400
KI 390 CH2$=CH1$(3,3):CH1$=CH1$(1,1)
UH 400 GOSUB 3060
OU 410 GOTO 270
KN 420 GRAPHICS 0:END
BA 1050 POSITION 1,2:FOR I=1 TO BPT1:PRIN
   T C$(I,I);:NEXT I
KI 1060 IF BPT2=0 THEN RETURN
JU 1070 POSITION 1,4:FOR I=BPT1+1 TO BPT2
   :PRINT C$(I,I);:NEXT I
LA 1080 IF BPT3=0 THEN RETURN
NW 1090 POSITION 1,6:FOR I=BPT2+1 TO BPT3
   :PRINT C$(I,I);:NEXT I
KO 1100 IF BPT4=0 THEN RETURN
QW 1110 POSITION 1,8:FOR I=BPT3+1 TO BPT4
   :PRINT C$(I,I);:NEXT I
AH 1120 RETURN
YV 2050 POSITION 1,1:FOR I=1 TO BPT1:PRIN
   T B$(I,I);:NEXT I
KJ 2060 IF BPT2=0 THEN RETURN
HK 2070 POSITION 1,3:FOR I=BPT1+1 TO BPT2
   :PRINT B$(I,I);:NEXT I
LB 2080 IF BPT3=0 THEN RETURN
LM 2090 POSITION 1,5:FOR I=BPT2+1 TO BPT3
   :PRINT B$(I,I);:NEXT I
KR 2100 IF BPT4=0 THEN RETURN
OM 2110 POSITION 1,7:FOR I=BPT3+1 TO BPT4
   :PRINT B$(I,I);:NEXT I
CW 2120 PRINT " "
AL 2130 RETURN
MX 3020 REM SEARCH CRYPTO AND PUT GUESS I
   N REPLACEMENT STRING, UPDATE ALPHA$
SX 3060 FOR I=1 TO LEN(A$):IF CH1$=A$(I,I
   ) THEN B$(I,I)=CH2$
FM 3070 NEXT I
BN 3080 ALPH$="ABCDEFGHIJKLMNOPQRSTUVWXYZ
   "
CS 3090 FOR I=1 TO LEN(A$):CH1$=B$(I,I):I
   F CH1$<>" " THEN T=ASC(CH1$)-ASC("A")+
   1:ALPH$(T,T)=" "
ET 3100 NEXT I
AG 3110 RETURN
MR 10090 BPT1=0:BPT2=0:BPT3=0:BPT4=0:REM
   BPTn IS THE BREAK POINT FOR EACH LINE
RC 10100 IF LEN(A$)<38 THEN BPT1=LEN(A$):
   RETURN :REM CHECK FOR A$ LESS THAN 1 L
   INE LONG
OI 10110 FOR I=38 TO 20 STEP -1:IF A$(I,I
   )=" " THEN 10130
FU 10120 NEXT I
DN 10130 BPT1=I
WO 10140 IF LEN(A$)<BPT1+38 THEN BPT2=LEN
   (A$):RETURN
OS 10150 FOR I=BPT1+38 TO BPT1+20 STEP -1
   :IF A$(I,I)=" " THEN 10170
GK 10160 NEXT I
EN 10170 BPT2=I
ZH 10180 IF LEN(A$)<BPT2+38 THEN BPT3=LEN
   (A$):RETURN
EV 10190 FOR I=BPT2+38 TO BPT2+20 STEP -1
   :IF A$(I,I)=" " THEN 10210
FP 10200 NEXT I
EC 10210 BPT3=I
AP 10220 IF LEN(A$)<BPT3+38 THEN BPT4=LEN
   (A$):RETURN
PJ 10230 FOR I=BPT3+38 TO BPT3+20 STEP -1
   :IF A$(I,I)=" " THEN 10250
GF 10240 NEXT I
FC 10250 BPT4=I
EB 10260 RETURN
```

bonus game

DARKSTAR

Article on page 31.

LISTING 1

```
; DARKSTAR, LISTING 1
; BY MICHAEL MITCHELL
; (c) 1985, ANTIC PUBLISHING

BYTE WSYNC=54282,VCOUNT=54283,
     CLR=53274,CTR,CLR1=53270,
     CHGCLR=[0],INCCLR1,S,INCCLR,
     CLR2=53271,A,B
CARD ML,SC,SP,Q,I

PROC WAIT(CARD N); MAIN DELAY
 FOR I=0 TO N+N
 DO OD
RETURN

PROC TITLE()    ; PRINT TITLE AND
SC=0  ML=0      ; SCROLL THE COLORS
GRAPHICS(2+16)
POSITION(5,2)
 PRINTDE(6,"dArKsTaR")
POSITION(8,4)
 PRINTDE(6,"By")
```

```
POSITION(1,6)
 PRINTDE(6," MiChAeL MItChEIL")
POSITION(0,09)
 PRINTDE(6,"PReSs FiRe To BeGiN!")
DO
 FOR CTR=1 TO 10
 DO
  INCCLR=CHGCLR INCCLR1=CHGCLR
  DO
   S=STRIG(0)
   IF S=0 THEN RETURN FI
   WSYNC=0
   CLR=INCCLR CLR1=INCCLR1
   CLR2=INCCLR+10

   INCCLR==+1 INCCLR1==-1
   UNTIL VCOUNT&128
  OD
 OD
 CHGCLR==+1
OD

PROC BOX()    ; DRAWS THE ENEMY
A=RAND(150)+3  B=RAND(74)+3 COLOR=1
PLOT(A,B)
DRAWTO(A+2,B) DRAWTO(A+2,B+2)
DRAWTO(A,B+2) DRAWTO(A,B)
RETURN

PROC MAIN() ;  THE MAIN ROUTINE
INT XX=[1],YY=[0],SS,X,Y,Q
BYTE Z,E,E1,A1,B1,D,C=[0]
BYTE A,B
X=50 Y=50

GRAPHICS(7) COLOR=2 ; DRAW BORDER
SNDRST()
PLOT(1,1)
DRAWTO(158,1) DRAWTO(158,79)
DRAWTO(1,79) DRAWTO(1,1)
BOX()
       ; LOOK FOR COLLISION
DO
 Z=LOCATE(X,Y)
 IF Z=1 THEN     ; ENEMY HAS BEEN HIT
  FOR E=1 TO 20
  DO WAIT(50) SOUND(0,E,08,10)
  SETCOLOR(2,E,10)
  OD
  SNDRST() BOX()
  SC==+10 SETCOLOR(2,0,0)
 FI
 IF Z=2 THEN     ; YOU HAVE BEEN HIT
 FOR D=1 TO 35
 DO COLOR=C
  SOUND(0,D,8,10) C==+1
  SETCOLOR(2,D,C) SETCOLOR(0,C,D)
  SETCOLOR(1,A1,B1)
  IF C=4 THEN C=1 FI
  A1=RAND(153) B1=RAND(78) PLOT(X,Y)
  DRAWTO(A1,B1)
 OD
 ML==+1  SNDRST()
  IF ML>2 THEN  ; CHECK FOR MEN LEFT
   ML=0 GRAPHICS(2+16)
   POSITION(4,4)
   PRINTD(6,"GAME OVER")
   POSITION(4,5)
   PRINTD(6,"SCORE: ") PRINTBDE(6,SC)
   FOR X=0 TO 242 STEP 2
   DO
    WAIT(500) SOUND(0,X+1,10,10)
    SOUND(1,X+2,10,10)
    SOUND(2,X+3,10,10)
    SOUND(3,X+4,10,10)
    SETCOLOR(0,X,10)
   OD
   WAIT(32000)    ; DELAY
   SC=0 TITLE()
   FI
  MAIN()
 FI

 Q==+1 SETCOLOR(1,Q,14)
 COLOR=2 PLOT(X,Y)
 SS=STICK(0)    ; READ THE JOYSTICK
  IF SS=14 THEN XX=0  YY=-1
  ELSEIF SS=13 THEN XX=0 YY=1
  ELSEIF SS=11 THEN XX=-1 YY=0
  ELSEIF SS=7 THEN XX=1 YY=0
  FI
 WAIT(350)  ; CHANGE WAIT VALUE FOR
            ; FASTER OR SLOWER SPEEDS
 X==+XX Y==+YY
 POKE(53279,5) ; KEYBOARD SOUND
OD
RETURN

PROC START()
 TITLE()
 MAIN()
```

Don't type the TYPO II Codes!

LISTING 2

```
JP 10 REM DARKSTAR, LISTING 2
SU 20 REM BY MICHAEL MITCHELL
FW 30 REM (C) 1985, ANTIC PUBLISHING
AH 40 GRAPHICS 17:SOUND 0,191,10,15:SOUND
    2,190,10,15:SH=2:SS=STICK(0)
KP 50 POSITION 5,5:? #6;"DARK STAR":POSIT
   ION 2,10:? #6;"by MICHAEL MITCHELL":POSIT
   ION 1,16:? #6;"PRESS FIRE to BEGIN"
GA 60 X=X+1:SETCOLOR 0,X,10:SETCOLOR 1,X+
   3,10:SETCOLOR 2,X+5,10:SETCOLOR 3,X+7,
   10:IF STRIG(0)=0 THEN 80
SY 70 GOTO 50
SS 80 POKE 559,0:POKE 53768,133:FOR S=1 T
   O 2500:NEXT S:GRAPHICS 23:POKE 559,0:S
   OUND 0,0,0,0:SOUND 2,0,0,0
RN 90 COLOR 3:XX=1:YY=0:X=50:Y=50:PLOT 2,
   2:DRAWTO 159,2:DRAWTO 159,79:DRAWTO 2,
   79:DRAWTO 2,2:POKE 559,34
XV 100 SETCOLOR 0,10,15:SETCOLOR 2,5,7:SC
   =SC+10
QK 110 A=RND(0)*152+3:B=RND(50)*70+5:COLO
   R 1:PLOT A,B:DRAWTO A+2,B
MA 120 POKE 77,0:DRAWTO A+2,B+2:DRAWTO A,
   B+2:DRAWTO A,B
ID 130 LOCATE X,Y,Z:IF Z=3 THEN 210
DR 140 COLOR 3:PLOT X,Y:POKE 53279,5:SS=S
   TICK(0):IF SS=14 THEN XX=0:YY=-1
TX 150 IF Z=1 THEN FOR B=10 TO 1 STEP -1:
   SETCOLOR 4,B,8:SOUND 0,10,8,B:NEXT B:X
   =X+XX:Y=Y+YY:SETCOLOR 4,0,0:GOTO 100
MN 160 IF SS=13 THEN XX=0:YY=1
MS 170 IF SS=11 THEN XX=-1:YY=0
FC 180 IF SS=7 THEN XX=1:YY=0
EW 190 X=X+XX:Y=Y+YY:GOTO 130
PG 200 REM EXPLOSION SUBROUTINE
DT 210 S=PEEK(560)+256*PEEK(561)+5:L=0:H=
   0:FOR LL=70 TO 0 STEP -1.3:L=L+60:IF L
   >255 THEN L=L-256:SOUND 0,LL,8,13
LM 220 SOUND 1,LL+5,8,14:SOUND 2,LL+10,8,
   12
HB 230 POKE S,L:POKE S+1,H:NEXT LL:SH=SH-
   1:IF SH<0 THEN GOSUB 300:GRAPHICS 18:G
   OTO 250
GU 240 GOSUB 300:GRAPHICS 7+16:GOTO 90
KL 250 SOUND 0,191,10,15:SOUND 2,190,10,1
   5
YY 260 POSITION 5,3:? #6;"GAME OVER":POSI
```

continued on next page

```
   TION 5,5:? #6;"SCORE ";SC:X=X+1
ST 270 SETCOLOR 0,X,X:IF X>350 THEN GOSUB
    300:GOTO 40
AO 280 IF STRIG(0)=0 THEN GOTO 80
MY 290 SH=2:GOTO 260
VT 300 FOR D=0 TO 3:SOUND D,0,0,0:NEXT D:
   RETURN
```

bonus game

OVERFLOW

Article on page 39.

LISTING 1

Don't type the TYPO II Codes!

```
BK 10 REM OVERFLOW
FU 20 REM BY ANSCHUETZ/WEISGERBER/ANSCHUE
   TZ
FW 30 REM (C) 1985, ANTIC PUBLISHING
RC 40 TUNL=50:WATR=148:MT=0
CQ 50 POKE 106,PEEK(740)
HP 60 MEM=PEEK(106):DL=(MEM-5)*256:CH=(ME
   M-4)*256:JW=MEM-12:EA=MEM-11:RA=(MEM-9
   )*256:S=(MEM-7)*256
MA 70 GRAPHICS 2:POKE 709,50:DIM Q(10),A$
   (46),B$(16):POKE 755,0:POSITION 6,4:?
   #6;"OVERFLOW"
DU 80 POKE 710,30:POKE 712,30:? :? "    A
   nschuetz/Weisgerber/Anschuetz":GOTO 41
   0
NM 90 POKE 709,TUNL:POKE 710,WATR:POKE 71
   2,0:POKE 707,TUNL
DW 100 POKE 89,JW:POKE 756,MEM-4:POKE 559
   ,62:POKE 560,0:POKE 561,MEM-5:POKE 532
   51,120:POKE 53248,123
RN 110 ? :? :? :? :FOR X=1 TO 10:Q(X)=INT
   (RND(0)*2)*2-1:NEXT X:SC=0:POKE 656,0:
   POKE 657,16:? "OVERFLOW"
OM 120 POKE 657,4:? "SCORE:0     ";:POKE 6
   57,26:? "HIGH:";HC;:YX=33:POKE 88,YX:P
   OSITION 0,0:? #6;A$(17,30)
XN 130 QL=DL+1:C=0:FOR X=DL+4 TO DL+31 ST
   EP 3:Y=INT(RND(0)*11)+101:Y=Y+(Y/2<>IN
   T(Y/2)):POKE X,Y:NEXT X
SF 140 C=C+1:QL=QL+3:POKE QL,PEEK(QL)+Q(C
   )
UZ 150 POKE 53278,0:IF QL>DL+28 THEN QL=D
   L+1:C=0
FJ 160 ST=STICK(0):IF ST=14 THEN YX=YX-16
   *(YX>33):POKE 88,YX:POSITION 0,0:? #6;
   A$(17,46)
VO 170 POKE 709,TUNL:POKE 710,WATR
LT 180 IF ST=13 THEN YX=YX+16*(YX<177):PO
   KE 88,YX-16:POSITION 0,0:? #6;A$(1,30)

CY 190 IF ST=7 AND J=0 THEN PLX=133:PLY=Y
   X+3:J=4:POKE 89,EA:POKE 88,YX+3:POSITI
   ON 0,0:? #6;B$(1,8):POKE 89,JW
DU 200 IF ST=11 AND J=0 THEN PLX=115:PLY=
   YX+3:J=-4:POKE 89,EA:POKE 88,YX+3:POSI
   TION 0,0:? #6;B$(9,16):POKE 89,JW
NW 210 IF PEEK(53255)>3 THEN POKE 707,WAT
   R:GOTO 360
OO 220 IF J<>0 THEN 240
NF 230 GOTO 140
CD 240 IF PEEK(53253)>3 THEN 270
WO 250 POKE 53249,PLX:PLX=PLX+J
DT 260 IF PEEK(53253)<4 THEN 290
VT 270 HQ=(PLY-20)/16:IF SGN(Q(HQ))<>SGN(
   J) THEN 330
HH 280 SOUND 0,100,10,10:SC=SC+10:Q(HQ)=-
   Q(HQ):POKE 657,10:? SC;:GOTO 310
RC 290 IF PLX>200 OR PLX<48 THEN 330
NA 300 GOTO 140
KY 310 POKE 77,0:IF SC=250 THEN SOUND 0,6
   0,10,12:GOTO 350
FN 320 IF SC=500 THEN SOUND 0,60,10,12:PO
   KE 53259,3:POKE 53251,112:FOR X=1 TO 1
   00:NEXT X
UU 330 POKE 53249,0:J=0:POKE 89,EA:POKE 8
   8,PLY:POSITION 0,0:? #6;A$(1,8):POKE 8
   9,JW:POKE 53278,0
MW 340 SOUND 0,0,0,0:GOTO 140
SP 350 FOR X=1 TO 10:Q(X)=Q(X)*2:NEXT X:F
   OR X=DL+4 TO DL+31 STEP 3:Y=PEEK(X):PO
   KE X,Y+(Y/2=INT(Y/2)):NEXT X:GOTO 330
DQ 360 J=0:POKE 656,3:POKE 657,9:? "PRESS
    <START> TO BEGIN";:IF SC>HC THEN HC=S
   C
MP 370 YC=YC+(YC<255)-255*(YC=255):POKE 7
   04,YC:IF PEEK(53279)<>6 THEN 370
FY 380 FOR X=DL+4 TO DL+31 STEP 3:POKE X,
   108:NEXT X:POKE 89,EA:POKE 88,PLY:POSI
   TION 0,0:? #6;A$(1,8):POKE 53251,120
YD 390 POKE 704,198
LT 400 POKE 89,JW:POKE 88,YX:POSITION 0,0
   :? #6;"                ":POKE 707,TUNL:
   POKE 53249,0:POKE 53259,1:GOTO 110
TN 410 FOR X=0 TO 511:POKE X+CH,PEEK(X+57
   344):NEXT X:FOR X=8 TO 23:READ A:POKE
   X+CH,A:NEXT X
SX 420 FOR X=DL TO DL+2:POKE X,112:NEXT X
   :FOR X=DL+3 TO DL+30 STEP 3:POKE X,69:
   POKE X+1,108:POKE X+2,S/256:NEXT X
EE 430 POKE DL+33,66:POKE DL+34,PEEK(660)
   :POKE DL+35,PEEK(661):FOR X=DL+36 TO D
   L+38:POKE X,2:NEXT X:POKE DL+39,65
QO 440 FOR X=RA+32 TO RA+191:POKE X,255:N
   EXT X:FOR X=JW*256 TO RA:POKE X,0:NEXT
    X:FOR X=1 TO 46:A$(X,X)=" ":NEXT X
HV 450 FOR X=17 TO 30:READ A:A$(X)=CHR$(A
   +32):NEXT X:A$(46,46)=" ":FOR X=1 TO 1
   6:READ A:B$(X)=CHR$(A):NEXT X
VF 460 POKE 623,1:POKE 54279,MEM-16:POKE
   53277,3:POKE 704,198:POKE 705,198:POKE
    707,TUNL:POKE 53259,1
NU 470 FOR X=S TO S+108:POKE X,2:POKE X+1
   47,2:NEXT X:FOR X=S+109 TO S+146:POKE
   X,1:NEXT X:SOUND 1,160,8,2:GOTO 90
KY 480 DATA 84,170,170,170,170,170,170,69
   ,84,255,255,255,255,255,255,69
XV 490 DATA 14,14,14,4,31,31,14,14,14,14,
   10,10,10,10,33,35,35,255,255,35,35,33,
   160,128,128,255,255,128,128,160
```


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bonus game

STAR VENTURE

Article on page 23.

LISTING 1

Don't type the TYPO II Codes!

```
KG 10 REM STAR VENTURE
JT 20 REM BY RONALD SAARI
FW 30 REM (C) 1985, ANTIC PUBLISHING
CP 40 POKE 106,PEEK(740)
TZ 50 GOSUB 780
HQ 60 DIM S$(1):S$="+"
QT 70 GOSUB 520
XV 80 SH=3:SC=0:SCREEN=0:MA=5:E=15
RS 90 GRAPHICS 0:POKE 756,STARTLIST/256:W
   =0:X=3:Y=12:N=9
VZ 100 ST=15:S$="+"
UR 110 POKE 710,0:POKE 752,1
PZ 120 ? "SCORE:"
ZL 130 POSITION 30,0:? "+ ";SH
QR 140 COLOR ASC("□"):PLOT 2,2:DRAWTO 38,
   2:DRAWTO 38,22:DRAWTO 2,22:DRAWTO 2,3
LX 150 POSITION 2,3:? "□"
NP 160 ON SCREEN GOSUB 940,950,960,970,98
   0
UA 170 A=INT(RND(0)*33)+4:B=INT(RND(0)*19
   )+3
LO 180 LOCATE A,B,L:IF L<>32 THEN 170
LW 190 POSITION A,B:? "■"
ZD 200 W=W+1:IF W=MA THEN 220
OI 210 GOTO 170
HZ 220 W=0
TT 230 A=INT(RND(0)*33)+4:B=INT(RND(0)*19
   )+3
HL 240 LOCATE A,B,L:IF L<>32 THEN 230
BZ 250 W=W+1:IF W=10 THEN 270
XO 260 POSITION A,B:? "♥":GOTO 230
FL 270 COLOR ASC("!"):PLOT 38,11:DRAWTO 3
   8,13:COLOR 32:PLOT 2,11:DRAWTO 2,13
AA 280 SOUND 0,100,10,5:SOUND 1,101,10,5
OK 290 FOR T=0 TO 3
BT 300 POSITION T,12:? "+":FOR D=1 TO 30:
   NEXT D:POSITION T,12:? " ":NEXT T:SOUN
   D 0,0,0,0:SOUND 1,0,0,0
NE 310 COLOR ASC("!"):PLOT 2,11:DRAWTO 2,
   13
CJ 320 POSITION 2,13:? "!"
QT 330 POSITION X,Y:? S$
YV 340 IF X=39 THEN SCREEN=SCREEN+1:GOTO
   90
ZM 350 POSITION 8,0:? SC
ZD 360 SOUND 0,5,0,1
JN 370 POSITION 20,0:? E;" "
JO 380 IF PEEK(53279)=6 THEN SOUND 0,0,0,
   0:GOTO 205
BZ 390 FOR T=1 TO 10:NEXT T:POSITION X,Y:
   ? " "
GX 400 IF STICK(0)=14 THEN Y=Y-1
ED 410 IF STICK(0)=13 THEN Y=Y+1
YG 420 IF STICK(0)=7 THEN ST=7
XN 430 IF STICK(0)=11 THEN ST=11
RN 440 IF ST=7 THEN X=X+1:S$="+"
HI 450 IF ST=11 THEN X=X-1:S$="■"
OQ 460 LOCATE X,Y,L:POKE 77,0
AO 470 IF L<>32 AND L<>0 AND L<>9 THEN 57
   0
CV 480 IF STRIG(0)=0 AND E>0 THEN E=E-1:S
   OUND 0,100,10,15:GOTO 500
EB 490 IF L=9 THEN 570
AV 500 IF L=0 THEN GOSUB 610
NN 510 GOTO 330
TI 520 GOSUB 700
PH 530 POSITION 11,19:? "    PRESS START
   "
BN 540 POKE 53279,8:SOUND 0,0,0,0
SS 550 IF PEEK(53279)=6 THEN POKE 53279,8
   :RETURN
PN 560 GOTO 550
SE 570 POKE 710,52:POSITION X,Y:? "X":FOR
   T=5 TO 0 STEP -1:SOUND 0,T+20,0,T:NEX
   T T:POKE 710,0
FH 580 POSITION X,Y:? " ":FOR T=15 TO 0 S
   TEP -0.4:SOUND 0,T+10,0,T:SOUND 1,T,12
   ,T/2:NEXT T
QE 590 SH=SH-1:IF SH=0 THEN 640
SJ 600 GOTO 90
JN 610 POSITION X,Y:? S$:FOR T=15 TO 0 ST
   EP -1:SOUND 0,121,10,T:SOUND 1,60,10,T
   :SOUND 2,243,10,T:NEXT T
OL 620 N=N-1:SC=SC+100:IF N=0 THEN 680
ZI 630 RETURN
GF 640 ? "■":POSITION 17,9:? "□□□□□□□□□":P
   OSITION 17,10:? "□ GAME □"
AY 650 POSITION 17,11:? "□ OVER □":POSITI
   ON 17,12:? "□□□□□□□□□"
PE 660 POSITION 2,0:? "SCORE:";SC
RY 670 GOSUB 530:GOTO 80
ZU 680 FOR T=15 TO 0 STEP -1:SOUND 0,150,
   10,T:NEXT T:FOR T=11 TO 13:POSITION 38
   ,T:? " ":NEXT T
ZU 690 RETURN
AE 700 GRAPHICS 0:POKE 710,0:POKE 752,1:P
   OKE 712,165
ET 710 POSITION 11,6:? "□□□□□□□□□□□□□□□□□□
   □□"
NU 720 POSITION 11,7:? "□
   □"
JF 730 POSITION 11,8:? "□  STAR  VENTURE
   □"
PG 740 POSITION 11,9:? "□
   □"
ZF 750 POSITION 11,10:? "□□□□□□□□□□□□□□□□□
   □□□"
DE 760 POSITION 13,13:? "By Ronald Saari"
BY 770 POSITION 7,16:? "(c) 1985, Antic P
   ublishing":RETURN
JZ 780 POKE 106,PEEK(106)-5:GRAPHICS 17
LN 790 POKE 755,1
GU 800 STARTLIST=(PEEK(106)+1)*256
JO 810 POKE 752,1
AN 820 GOSUB 700:POSITION 7,19:? "Refueli
   ng, Please stand by...":FOR MOVEME=0 T
   O 1023
PP 830 POKE 709,PEEK(20):SOUND 0,(INT(-0.
   24*MOVEME+255)),8,4
JL 840 POKE STARTLIST+MOVEME,PEEK(57344+M
   OVEME):NEXT MOVEME
ZV 850 RESTORE 890
ZJ 860 READ KY:IF KY=-1 THEN RETURN
EJ 870 FOR MOVEME=0 TO 7:READ VALUE:POKE
   KY+STARTLIST+MOVEME,VALUE:NEXT MOVEME
RJ 880 GOTO 860
FS 890 DATA 512,0,0,36,24,24,36,0,0
VY 900 DATA 584,24,90,60,255,255,60,90,24
XE 910 DATA 712,63,31,56,254,254,56,31,63
IP 920 DATA 664,252,248,28,127,127,28,248
   ,252
GK 930 DATA -1
OZ 940 PLOT 20,7:DRAWTO 20,18:RETURN
CB 950 PLOT 12,7:DRAWTO 12,18:PLOT 28,7:D
   RAWTO 28,18:RETURN
WA 960 PLOT 12,4:DRAWTO 28,20:PLOT 28,4:D
   RAWTO 12,20:RETURN
QB 970 PLOT 18,7:DRAWTO 12,7:DRAWTO 12,18
   :DRAWTO 28,18:DRAWTO 28,7:DRAWTO 22,7:
   RETURN
ZJ 980 SCREEN=0:E=E+5:IF MA<20 THEN MA=MA
   +5
ZX 990 RETURN
```

game of the month

MINIATURE GOLF

Article on page 46.

LISTING 1

Don't type the TYPO II Codes!

```
VV 1 REM MINIATURE GOLF
MI 2 REM BY DAVID AND MARISA PLOTKIN
FD 3 REM (C) 1985, ANTIC PUBLISHING
KQ 5 GOSUB 3000
RF 10 GRAPHICS 0:GOSUB 1500:HOLSCR=0:PN=1
   :MAXHOLE=8:GOSUB 1600:REM GET NAMES AN
   D SETUP P/M GRAPHICS
DQ 15 F1=1:STARTHOLE=1
TP 20 FOR HOLENUM=STARTHOLE TO MAXHOLE
BH 30 GOSUB 1750:GOSUB 1000:REM SHOW STAT
   US AND DRAW HOLE
TF 40 IF PN<=NUMPLAY THEN GOSUB 900:GOSUB
    700:POKE 77,0:GOTO 40:REM LOOP TIL EV
   ERYONE HAS DONE THE HOLE
IH 50 PN=1:GOSUB 1450:PRINT #6;CHR$(125);
   :POKE 53278,0:NEXT HOLENUM:REM ERASE P
   /M, SCREEN, GO TO NEXT HOLE
GX 60 GOTO 3100:REM GAME OVER!
XJ 700 REM MOVE THE BALL AROUND THE FIELD

QA 705 HOLSCR=HOLSCR+1:TOTAL(PN)=TOTAL(PN
   )+1:GOSUB 1765:FL=0:OLDX=BALLX:OLDY=BA
   LLY
QS 710 FOR L=1 TO VEL:TESTX=ABS(BALLX+MX-
   48):TESTY=ABS(BALLY+MY-15):LOCATE TEST
   X,TESTY,Z
QV 715 IF (Z=0 AND PEEK(53260)=0) THEN GO
   TO 770
NX 716 SOUND 0,40,8,14:SOUND 0,0,0,0
YG 717 IF Z=0 THEN GOTO 750
MK 720 IF Z=1 THEN MX=-MX:LOCATE ABS(BALL
   X+MX-48),TESTY,Z1:IF Z1<>0 THEN MY=-MY

CQ 730 IF Z=3 THEN MY=-MY:LOCATE TESTX,AB
   S(BALLY+MY-15),Z1:IF Z1<>0 THEN MX=-MX
PY 735 HX=ABS(MX):HY=ABS(MY):HSX=SGN(MX):
   HSY=SGN(MY):IF Z<>2 THEN GOTO 770
PB 736 HSX=HSX+(HSX=0):HSY=HSY+(HSY=0)
JE 740 MX=HY*HSX:MY=HX*HSY:LOCATE ABS(BAL
   LX+MX-48),ABS(BALLY+MY-15),Z1:IF Z1=0
   THEN GOTO 770
WT 745 MX=-HY*HSX:MY=-HX*HSY:LOCATE ABS(B
   ALLX+MX-48),ABS(BALLY+MY-15),Z1:IF Z1=
   0 THEN GOTO 770
QJ 747 MX=-HX*HSX:MY=-HY*HSY:GOTO 770
MR 750 IF PEEK(53260)=4 THEN MY=-MY:REM H
   IT THE BARRIER
PM 760 IF PEEK(53260)=8 THEN GOSUB 850:GO
   TO 790:REM HIT THE HOLE
NL 770 BALLX=BALLX+MX:BALLY=BALLY+MY
SO 775 D=USR(ADR(UD0$),ADR(BALL$),PMB+512
   +BALLY,3,BALLX):IF (BX>=RITEX OR BX<=L
   EFTX) THEN SPEED=-SPEED
DP 776 BX=BX+SPEED:POKE 53250,BX
HL 780 POKE 53278,0:NEXT L:REM CLEAR COLL
   ISIONS
ZV 790 RETURN
ME 800 IF (BX>=RITEX OR BX<=LEFTX) THEN S
   PEED=-SPEED:REM MOVE THE BARRIER
CM 810 BX=BX+SPEED:POKE 53250,BX
ZI 820 RETURN
BY 840 REM BALL GOES IN THE HOLE
QJ 850 FOR WW=0 TO 100 STEP 2:SOUND 0,WW,
   10,4:SOUND 1,100-WW,10,4:POKE 712,WW:N
   EXT WW
YQ 860 SOUND 0,0,0,0:SOUND 1,0,0,0:POKE 7
   12,198
FT 870 PN=PN+1:HOLSCR=0:FL=1:IF PN<=NUMPL
   AY THEN GOSUB 1750:GOSUB 1490:GOSUB 10
   80:POKE 53278,0
ZU 880 RETURN
ZE 900 REM MOVE THE CLUB UNDER JOYSTICK C
   ONTROL

UM 905 CLUBX=BALLX:CLUBY=BALLY
QT 910 P6=PEEK(632):CLUBX=CLUBX+2*(P6>4 A
   ND P6<8)*(CLUBX<204)-2*(P6>8 AND P6<12
   )*(CLUBX>46)
GB 915 IF PEEK(53260)>=4 THEN BALLY=BALLY
   +MY:D=USR(ADR(UD0$),ADR(BALL$),PMB+512
   +BALLY,3,BALLX):POKE 53278,0
PW 920 CLUBY=CLUBY+2*(P6=5 OR P6=13 OR P6
   =9)*(CLUBY<112)-2*(P6=10 OR P6=14 OR P
   6=6)*(CLUBY>12)
CY 925 IF FL=1 OR PEEK(53279)<>6 OR HOLSC
   R=0 THEN 930
IX 926 FL=1:HOLSCR=HOLSCR-1:TOTAL(PN)=TOT
   AL(PN)-1:GOSUB 1765:GOSUB 1480
MG 927 BALLX=OLDX:BALLY=OLDY:D=USR(ADR(UD
   0$),ADR(BALL$),PMB+512+BALLY,3,BALLX):
   CLUBX=BALLX:CLUBY=BALLY
BS 930 D=USR(ADR(UD1$),ADR(CLUB$),PMB+639
   +CLUBY,9,CLUBX)
MG 931 IF PEEK(53279)=5 THEN GOSUB 3400:R
   EM DISPLAY THE SCORES
QS 933 IF PEEK(644)=1 THEN GOSUB 800:GOTO
    910
FR 935 IF (BALLY=CLUBY AND BALLX=CLUBX) T
   HEN PRINT CHR$(253);:GOTO 910
WJ 940 DX=ABS(BALLX-CLUBX):DY=ABS(BALLY-C
   LUBY):MX=SGN(BALLX-CLUBX):IF DX<>0 THE
   N MY=DY/DX*SGN(BALLY-CLUBY):SS=DX
ON 945 IF DY>DX THEN MX=DX/DY*SGN(BALLX-C
   LUBX):MY=SGN(BALLY-CLUBY):SS=DY
DZ 950 FOR LS=1 TO SS:CLUBX=CLUBX+MX:CLUB
   Y=CLUBY+MY:SOUND 0,LS,8,2
VZ 960 D=USR(ADR(UD1$),ADR(CLUB$),PMB+639
   +CLUBY,9,CLUBX):NEXT LS:REM MOVE THE C
   LUB
FV 965 M=ABS(DX)+ABS(DY):S=3+(M>15)+(M>20
   )+(M>25)+2*(M>30)+2*(M>35)
PR 970 SOUND 0,40,8,14:SOUND 0,0,0,0:VEL=
   5*M:REM SET SPEED OF BALL
EF 980 D=USR(ADR(UD1$),ADR(BLANK$),PMB+63
   9+CLUBY,9,CLUBX):REM ERASE CLUB
ZX 990 RETURN
YH 1000 RESTORE (2000+(HOLENUM-1)*20):REA
   D HOLEX,HOLEY,STARTX,STARTY,NUMTARG
CR 1005 COLOR 1:PLOT 0,0:DRAWTO 0,79:PLOT
    159,0:DRAWTO 159,79:COLOR 3:PLOT 0,0:
   DRAWTO 159,0:PLOT 0,79
DC 1006 DRAWTO 159,79:COLOR 2:PLOT 0,0:PL
   OT 0,79:PLOT 159,0:PLOT 159,79:COLOR 1
   :PLOT 1,0:DRAWTO 1,79
CU 1010 FOR L2=1 TO NUMTARG:READ TYPE,X,Y
   :IF TYPE=1 OR TYPE=2 THEN GOSUB 1100:R
   EM DRAW TYPE 1/2-DOWN/UP TRIANGLE
ZC 1020 IF TYPE=3 OR TYPE=4 THEN GOSUB 12
   00:REM DRAW TYPE 3/4-RIGHT/LEFT TRIANG
   LE
VS 1030 IF TYPE=5 THEN GOSUB 1300:REM DRA
   W SQUARE OR RECTANGLE
AI 1040 IF TYPE=6 THEN GOSUB 1400:REM DRA
   W BARRIER
PQ 1045 IF TYPE=7 THEN GOSUB 1430:REM DRA
   W THE DIAGONAL LINES
DN 1050 NEXT L2
GK 1060 HOLEX=HOLEX+48:HOLEY=HOLEY+16:FOR
    W=0 TO 3:POKE PMB+896+HOLEY+W,HOLE(W)
   :NEXT W:POKE 53251,HOLEX
NG 1070 STARTX=STARTX+48:STARTY=STARTY+15
   :CLUBX=STARTX:CLUBY=STARTY
AE 1075 D=USR(ADR(UD1$),ADR(CLUB$),PMB+63
   9+CLUBY,9,CLUBX)
TJ 1080 BALLX=STARTX:BALLY=STARTY:D=USR(A
   DR(UD0$),ADR(BALL$),PMB+512+BALLY,3,BA
```

```
   LLX)
BA 1090 RETURN
FH 1100 READ X1:XC=(X+X1)/2:I=(TYPE=1)-(T
   YPE=2)
LT 1110 LP=Y-I:FOR LQ=X TO XC:COLOR 1:LP=
   LP+I:PLOT LQ,Y:DRAWTO LQ,LP:COLOR 2:PL
   OT LQ,LP:PLOT LQ,LP+I
AM 1115 NEXT LQ:LP=LP+I
UA 1120 FOR LQ=XC TO X1:COLOR 1:LP=LP-I:P
   LOT LQ,Y:DRAWTO LQ,LP:COLOR 2:PLOT LQ,
   LP:PLOT LQ,LP+I:NEXT LQ
VA 1130 COLOR 3:PLOT X+1,Y:DRAWTO X1-1,Y:
   RETURN
NJ 1200 READ Y1:YC=(Y+Y1)/2:I=(TYPE=4)-(T
   YPE=3)
XN 1210 LQ=X+I:FOR LP=Y TO YC:COLOR 1:LQ=
   LQ-I:PLOT X,LP:DRAWTO LQ,LP:COLOR 2:PL
   OT LQ,LP:PLOT LQ-I,LP
CV 1215 NEXT LP:LQ=LQ-I
WH 1220 FOR LP=YC TO Y1:COLOR 1:LQ=LQ+I:P
   LOT X,LP:DRAWTO LQ,LP:COLOR 2:PLOT LQ,
   LP:PLOT LQ-I,LP:NEXT LP
AM 1230 RETURN
OH 1300 READ X1,Y1
VU 1310 COLOR 1:FOR LP=Y TO Y1:PLOT X,LP:
   DRAWTO X1,LP:NEXT LP:COLOR 3:PLOT X,Y:
   DRAWTO X1,Y:PLOT X,Y1:DRAWTO X1,Y1
MH 1320 COLOR 2:PLOT X,Y:PLOT X1,Y:PLOT X
   1,Y1:PLOT X,Y1
AO 1330 RETURN
ZA 1400 READ X1,SPEED:BX=X+48:BY=Y+15:LEF
   TX=BX:RITEX=X1+48:BX=BX+SPEED
YK 1410 D=USR(ADR(UD2$),ADR(BARRIER$),PMB
   +768+BY,5,BX)
AN 1420 RETURN
UY 1430 READ X1:Y1=Y+ABS(X1-X):COLOR 2:PL
   OT X,Y:DRAWTO X1,Y1:PLOT X,Y+1:DRAWTO
   X1,Y1+1
AT 1440 RETURN
BM 1450 REM ERASE P/M GRAPHICS SHAPES
NY 1460 FOR W=0 TO 3:POKE PMB+896+HOLEY+W
   ,0:NEXT W:REM ERASE THE HOLE
YI 1470 D=USR(ADR(UD2$),ADR(BLANK$),PMB+7
   68+BY,5,0):REM THEN THE BARRIER
UX 1480 D=USR(ADR(UD1$),ADR(BLANK$),PMB+6
   39+CLUBY,9,0):REM NOW THE CLUB
UH 1490 D=USR(ADR(UD0$),ADR(BLANK$),PMB+5
   12+BALLY,3,0):RETURN :REM FINALLY THE
   BALL
SO 1500 REM GET THE NAMES OF PLAYERS
ZK 1505 POSITION 10,3:? "MINIATURE GOLF";

ZR 1510 POSITION 0,5:? "How many players
   (max 8)";:INPUT NUMPLAY:IF NUMPLAY>8 T
   HEN ? CHR$(125):GOTO 1510
SL 1520 DIM NAME$(NUMPLAY*10),NN$(10),TOT
   AL(NUMPLAY)
BU 1530 FOR L=1 TO NUMPLAY:PRINT "NAME OF
    PLAYER #";L;" (MAX 10 LETTERS)":INPUT
    NN$:R=LEN(NN$)+1
OK 1540 IF R<=10 THEN FOR L1=R TO 10:NN$(
   L1,L1)=" ":NEXT L1
PY 1550 NAME$((L-1)*10+1,L*10)=NN$:TOTAL(
   L)=0:NEXT L:RETURN
GL 1600 REM SETUP P/M GRAPHICS
ER 1610 PMBASE=PEEK(106)-24:POKE 88,0:POK
   E 89,PMBASE:? CHR$(125)
IZ 1620 GRAPHICS 7:PMB=PMBASE*256:POKE 54
   279,PMBASE:POKE 53277,3:POKE 559,46:PO
   KE 623,1:POKE 752,1
FX 1630 DIM UD0$(44),UD1$(44),UD2$(44):RE
   STORE 1640:FOR W=1 TO 44:READ P:UD0$(W
   ,W)=CHR$(P):NEXT W
JZ 1640 DATA 104,104,133,215,104,133,214,
    104,133,217,104,133,216,104,133,218
AT 1650 DATA 104,170,160,0,177,214,145,21
   6, 200,208,4,230,215,230,217,202
EK 1660 DATA 208,242,198,218,16,238,104,
   104,141,0,208,96
EL 1670 UD1$=UD0$:UD2$=UD0$:UD1$(42,42)=C
   HR$(1):UD2$(42,42)=CHR$(2)
OR 1680 POKE 704,14:POKE 705,24:POKE 706,
   52:POKE 707,100:POKE 708,200:POKE 709,
   228:POKE 710,206:POKE 712,198
CK 1690 DIM CLUB$(9),BARRIER$(5),HOLE(4),
   BALL$(3),BLANK$(9):RESTORE 1740
YL 1700 FOR W=1 TO 9:READ P:CLUB$(W,W)=CH
   R$(P):NEXT W
AS 1710 FOR W=1 TO 5:READ P:BARRIER$(W,W)
   =CHR$(P):NEXT W
YC 1720 FOR W=0 TO 3:READ P:HOLE(W)=P:NEX
   T W
JX 1730 FOR W=1 TO 3:READ P:BALL$(W,W)=CH
   R$(P):NEXT W
OP 1735 FOR W=1 TO 9:BLANK$(W,W)=CHR$(0):
   NEXT W:RETURN
IG 1740 DATA 0,0,124,252,252,252,252,0,0,
   0,255,255,255,0,112,248,248,112,0,128,
   0
HO 1750 POKE 656,0:POKE 657,0:PRINT "PLAY
   ER: ";NAME$((PN-1)*10+1,PN*10);:POKE 6
   57,22:? "SELECT for scores";
VZ 1760 POKE 656,1:POKE 657,1:PRINT "HOLE
    NUMBER: ";HOLENUM;:POKE 657,22:? "OPT
   ION to return";
JP 1765 POKE 656,2:POKE 657,1
CV 1770 PRINT "HOLE SCORE: ";HOLSCR;"  ";
   :POKE 657,21:PRINT "TOTAL SCORE: ";TOT
   AL(PN);"  ";:RETURN
AS 2000 DATA 5,7,80,72,6,1,68,1,92,5,1,50
   ,45,78,5,45,22,65,78,5,95,22,115,78,5,
   115,50,158,78,6,65,22,87,2
DW 2020 DATA 4,7,142,65,2,5,1,35,125,78,7
   ,130,1,158
LA 2040 DATA 78,7,80,66,5,5,1,1,60,78,5,1
   00,1,159,78,7,70,1,61,7,90,1,99,1,66,1
   5,94
TY 2060 DATA 10,70,143,66,3,5,41,30,119,7
   8,7,20,1,1,7,140,1,158

QJ 2080 DATA 15,60,143,60,3,5,40,20,44,78
   ,5,80,1,84,60,5,120,20,124,78
WY 2100 DATA 78,20,80,70,10,1,40,1,70,1,9
   0,1,120,2,40,50,70,2,90,50,120
DC 2101 DATA 5,1,1,54,78,5,54,50,70,78,5,
   106,1,158,78,5,90,50,106,78,6,55,27,97

CI 2102 DATA 2,7,72,30,84
MW 2120 DATA 10,15,128,65,4,5,1,40,80,79,
   7,100,1,120,7,140,40,158,7,1,22,12
YH 2140 DATA 145,26,40,65,7,2,90,55,130,5
   ,70,34,109,78,5,110,55,158,78,7,130,1,
   110,5,70,21,110,22
FK 2141 DATA 5,1,1,10,78,7,53,1,20
RG 3000 GRAPHICS 2+16:POKE 708,36
WR 3010 POKE 752,1:POSITION 2,1:? #6;"DAV
   ID AND [MARISA]    Plotkin  PRESENT";:PO
   SITION 1,3
JL 3015 ? #6;"*=*=*=*=*=*=*=*=*=*=*";
SE 3020 POSITION 1,4:? #6;"* [M]i[n]i[a]t[u]r[e] [G]o
   [f] *";:POSITION 5,6:? #6;"[PRESS] FIRE";

RD 3025 POSITION 1,5:? #6;"*=*=*=*=*=*=*=*=
   *=*=*";
HW 3030 HOLD=PEEK(708):POKE 708,PEEK(710)
   :POKE 710,HOLD
AZ 3040 FOR W=1 TO 10:NEXT W:IF STRIG(0)=
   0 THEN RETURN
PO 3050 GOTO 3030
PP 3100 REM GAME OVER SEQUENCE
RI 3110 POKE 53277,0:POKE 559,34:GRAPHICS
    1+16:POKE 708,52:POSITION 0,0:? #6;"
      MINIATURE GOLF ";:REM TURN OFF P/M
WP 3120 POSITION 0,1:? #6;"      SCORE BOA
   RD";:POSITION 0,2:? #6;CHR$(138);:POSI
   TION 1,2:? #6;CHR$(170);
PE 3125 POSITION 0,23:? #6;CHR$(10);:POSI
   TION 1,23:? #6;CHR$(170);:FOR W=2 TO 1
   7 STEP 3:POSITION W,2
LV 3130 ? #6;CHR$(10);:POSITION W+1,2:? #
   6;CHR$(138);:POSITION W+2,2:? #6;CHR$(
   170);
AE 3140 POSITION W,23:? #6;CHR$(138);:POS
   ITION W+1,23:? #6;CHR$(10);:POSITION W
   +2,23:? #6;CHR$(170);:NEXT W
CB 3150 FOR W=3 TO 21 STEP 3:POSITION 19,
   W:? #6;CHR$(10);:POSITION 19,W+1:? #6;
   CHR$(138);
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continued on next page

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CX 3160 POSITION 19,W+2:? #6;CHR$(170);:N
   EXT W
RD 3170 FOR W=3 TO 21 STEP 3:POSITION 0,W
   :? #6;CHR$(170);:POSITION 0,W+1:? #6;C
   HR$(138);
IH 3180 POSITION 0,W+2:? #6;CHR$(10);:NEX
   T W:FOR PN=1 TO NUMPLAY:POSITION 2,PN+
   3
UQ 3190 ? #6;NAME$((PN-1)*10+1,PN*10);:PO
   SITION 14,PN+3:? #6;TOTAL(PN);:NEXT PN
   :REM PRINT THE NAMES AND SCORES
CS 3200 WIN=1:IF NUMPLAY=1 THEN GOTO 3240
   :REM ONLY ONE PLAYER
XE 3210 FOR PN=2 TO NUMPLAY:IF TOTAL(PN)<
   TOTAL(PN-1) THEN WIN=PN:REM FIND THE W
   INNER (LOW SCORE)
PT 3220 NEXT PN:FOR PN=1 TO NUMPLAY:IF PN
   <>WIN THEN IF TOTAL(PN)=TOTAL(WIN) THE
   N WIN=0
SD 3230 NEXT PN
RR 3240 POSITION 2,21:IF WIN=0 THEN ? #6;
   "NO WINNER--A TIE!";:GOTO 3260
AL 3250 ? #6;"WINNER:";NAME$((WIN-1)*10+1
   ,WIN*10);
ZM 3260 POSITION 1,22:? #6;"PRESS FIRE TO
    PLAY";
RR 3300 HOLD=PEEK(709):POKE 709,PEEK(710)
   :POKE 710,PEEK(711):POKE 711,HOLD
PV 3310 FOR W=1 TO 10:NEXT W:IF STRIG(0)=
   0 THEN RUN
PI 3320 GOTO 3300
YY 3400 REM DISPLAY THE SCORES
MZ 3410 ? CHR$(125):FOR LLO=1 TO NUMPLAY
WL 3420 IF LLO/2<>INT(LLO/2) THEN POKE 65
   7,0:GOTO 3440
VH 3430 POKE 657,20
WK 3440 POKE 656,INT((LLO-1)/2)
ES 3450 ? NAME$((LLO-1)*10+1,LLO*10);" ";
   TOTAL(LLO);:NEXT LLO
YS 3460 IF PEEK(53279)<>3 THEN 3460
RV 3470 ? CHR$(125):GOSUB 1750:RETURN
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LISTING 2

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PA 10 REM MINI GOLF CONSTRUCTION SET
WE 20 REM BY DAVID AND MARISA PLOTKIN
FW 30 REM (C) 1985, ANTIC PUBLISHING
NK 100 GRAPHICS 0:GOSUB 800:REM PRINT THE
    TITLE
YN 110 DIM FILE$(15),T1(45),T2(45),T3(45)
   ,T4(45),T5(60),T6(3),T7(45),X(60),T$(2
   ),XX(60)
AH 120 REM OUTPUT DEVICE
KA 130 ? "WHAT DEVICE AND FILENAME (FOR C
   ASSETTE  USE C:)";:INPUT #16;FILE$:T$=
   FILE$(1,2)
LS 140 IF (T$="C:" OR T$="D:" OR T$="D1"
   OR T$="D2") THEN GOTO 160
IP 150 ? "INVALID DEVICE SPECIFIED. PLEAS
   E USE  C: OR D:FILENAME":GOTO 130
US 160 GOSUB 1000:REM INITIAL QUANTITIES
MT 170 GOSUB 1100:REM TYPE 1 (DOWN TRIANG
   LES)
QH 180 GOSUB 1200:REM TYPE 2 (UP TRIANGLE
   S)
AX 190 GOSUB 1300:REM TYPE 3 (RIGHT TRIAN
   GLES)
BN 200 GOSUB 1400:REM TYPE 4 (LEFT TRIANG
   LES)
WF 210 GOSUB 1500:REM TYPE 5 (RECTANGLES)

DC 220 GOSUB 1600:REM TYPE 6 (MOVING BARR
   IER)
WA 230 GOSUB 1700:REM TYPE 7 (DIAGONAL LI
   NES)
KF 240 TRAP 240:GOSUB 1800:REM PREVIEW, E
   DIT OR SAVE MENU
AO 250 ON CHOICE GOTO 2000,2300,2500,799:
   REM CHOOSE THE MENU SELECTION

PP 799 END
ZX 800 ? "":POSITION 4,0:? "MINIATURE GO
   LF CONSTRUCTION SET":? :RETURN
XW 850 ? "INVALID QUANTITY ENTERED. PLEAS
   E TRY  AGAIN":RETURN
ZI 1000 GOSUB 800:? "WHAT HOLE NUMBER:";:
   INPUT #16;HOLE
TC 1010 ? "WHAT X POSITION FOR HOLE (0-15
   9)";:INPUT #16;HOLEX
IK 1020 IF (HOLEX<0 OR HOLEX>159) THEN GO
   SUB 850:GOTO 1010
IP 1030 ? "WHAT Y POSITION FOR HOLE (0-79
   )";:INPUT #16;HOLEY
EM 1040 IF (HOLEY<0 OR HOLEY>79) THEN GOS
   UB 850:GOTO 1030
TO 1050 ? "WHAT START X POS. FOR BALL (0-
   159)";:INPUT #16;STARTX
FH 1060 IF (STARTX<0 OR STARTX>159) THEN
   GOSUB 850:GOTO 1050
BW 1070 ? "WHAT START Y POS. FOR BALL (0-
   79)";:INPUT #16;STARTY
XW 1080 IF (STARTY<0 OR STARTY>79) THEN G
   OSUB 850:GOTO 1070
BA 1090 RETURN
MF 1100 GOSUB 800:? "◥ DOWN TRIANGLE PLA
   CEMENT ◥"
SN 1110 ? "HOW MANY DOWN TRIANGLES (15 MA
   X)";:INPUT T1
OO 1120 IF T1>15 THEN GOSUB 850:GOTO 1110

BT 1130 IF T1=0 THEN GOTO 1190
EJ 1140 ? "FORMAT: UPPER LEFT X AND Y, UP
   PER      RIGHT X"
MK 1150 FOR L=1 TO T1:LL=(L-1)*3
KX 1160 ? "TRIANGLE NUMBER ";L;" POSITION
   ";
WF 1170 INPUT X,Y,X1:IF (X>159 OR X1>159
   OR Y>79 OR X1<X) THEN GOSUB 850:GOTO 1
   160
XP 1180 T1(LL)=X:T1(LL+1)=Y:T1(LL+2)=X1:N
   EXT L
BC 1190 RETURN
LS 1200 GOSUB 800:? "◢◣ UP TRIANGLE PLACE
   MENT ◢◣"
QL 1210 ? "HOW MANY UP TRIANGLES (15 MAX)
   ";:INPUT T2

QK 1220 IF T2>15 THEN GOSUB 850:GOTO 1210

DE 1230 IF T2=0 THEN GOTO 1290
ZF 1240 ? "FORMAT: LOWER LEFT X AND Y, LO
   WER      RIGHT X"
NE 1250 FOR L=1 TO T2:LL=(L-1)*3
KZ 1260 ? "TRIANGLE NUMBER ";L;" POSITION
   ";
ZG 1270 INPUT X,Y,X1:IF (X>159 OR X1>159
   OR Y>79 OR X1<X) THEN GOSUB 850:GOTO 1
   260
ZP 1280 T2(LL)=X:T2(LL+1)=Y:T2(LL+2)=X1:N
   EXT L
BE 1290 RETURN
SB 1300 GOSUB 800:? "◣ RIGHT TRIANGLE PLA
   CEMENT ◣"
WL 1301 ? "◤                                ◤"
ZF 1310 ? "HOW MANY RIGHT TRIANGLES (15 M
   AX)";:INPUT T3
SG 1320 IF T3>15 THEN GOSUB 850:GOTO 1310

EP 1330 IF T3=0 THEN GOTO 1390
RA 1340 ? "FORMAT: UPPER LEFT X AND Y, LO
   WER      LEFT Y"
NY 1350 FOR L=1 TO T3:LL=(L-1)*3
LB 1360 ? "TRIANGLE NUMBER ";L;" POSITION
   ";
TL 1370 INPUT X,Y,Y1:IF (X>159 OR Y>79 OR
    Y1>79 OR Y1<Y) THEN GOSUB 850:GOTO 13
   60
CY 1380 T3(LL)=X:T3(LL+1)=Y:T3(LL+2)=Y1:N
   EXT L
DG 1390 RETURN
BV 1400 GOSUB 800:? "◢ LEFT TRIANGLE PLAC
   EMENT ◢"
CH 1401 ? "◥                                ◥"
DD 1410 ? "HOW MANY LEFT TRIANGLES (15 MA
   X)";:INPUT T4
UC 1420 IF T4>15 THEN GOSUB 850:GOTO 1410

GA 1430 IF T4=0 THEN GOTO 1490
VA 1440 ? "FORMAT: UPPER RIGHT X AND Y, L
   OWER     RIGHT Y"
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OS 1450 FOR L=1 TO T4:LL=(L-1)*3
LD 1460 ? "TRIANGLE NUMBER ";L;" POSITION
   ";
WL 1470 INPUT X,Y,Y1:IF (X>159 OR Y>79 OR
    Y1>79 OR Y1<Y) THEN GOSUB 850:GOTO 14
   60
EY 1480 T4(LL)=X:T4(LL+1)=Y:T4(LL+2)=Y1:N
   EXT L
BI 1490 RETURN
PD 1500 GOSUB 800:? "SQUARE/RECTANGLE PLA
   CEMENT"
NC 1510 ? "HOW MANY RECTANGLES (15 MAX)";
   :INPUT T5
VY 1520 IF T5>15 THEN GOSUB 850:GOTO 1510

HL 1530 IF T5=0 THEN GOTO 1590
XD 1540 ? "FORMAT: UPPER LEFT X AND Y, LO
   WER      RIGHT X AND Y"
QP 1550 FOR L=1 TO T5:LL=(L-1)*4
BJ 1560 ? "RECTANGLE NUMBER ";L;" POS.";
TS 1570 INPUT X,Y,X1,Y1:IF (X>159 OR X1>1
   59 OR Y>79 OR Y1>79 OR X1<X OR Y1<Y) T
   HEN GOSUB 850:GOTO 1560
CB 1580 T5(LL)=X:T5(LL+1)=Y:T5(LL+2)=X1:T
   5(LL+3)=Y1:NEXT L
BK 1590 RETURN
LI 1600 GOSUB 800:? "MOVING BARRIER PLACE
   MENT"
TH 1610 ? "HOW MANY BARRIERS (0-NONE 1-FO
   R    BARRIER)";:INPUT T6
US 1620 IF (T6<>0 AND T6<>1) THEN GOSUB 8
   50:GOTO 1610
IW 1630 IF T6=0 THEN GOTO 1690
QB 1640 ? "FORMAT: LEFT X AND Y BOUNDARY,
    RIGHT XBOUNDARY"
IU 1650 INPUT BX,BY,BX1:IF (BX>159 OR BX1
   >159 OR BY>79 OR BX1<BX) THEN GOSUB 85
   0:GOTO 1650
ZJ 1660 ? "WHAT SPEED (3-4 WORKS BEST)";:
   INPUT SPEED
ZO 1670 T6(0)=BX:T6(1)=BY:T6(2)=BX1:T6(3)
   =SPEED
BM 1690 RETURN
NV 1700 GOSUB 800:? "DIAGONAL LINE PLACEM
   ENT"
UI 1710 ? "HOW MANY DIAGONAL LINES (15 MA
   X)";:INPUT T7
ZO 1720 IF T7>15 THEN GOSUB 850:GOTO 1710
KH 1730 IF T7=0 THEN GOTO 1790
OV 1740 ? "FORMAT: UPPER X AND Y, LOWER X
   "
RA 1750 FOR L=1 TO T7:LL=(L-1)*3
MK 1760 ? "DIAGONAL LINE NUMBER ";L;" POS
   .";
FJ 1770 INPUT X,Y,X1:IF (X>159 OR X1>159
   OR Y>79) THEN GOSUB 850:GOTO 1760
JP 1780 T7(LL)=X:T7(LL+1)=Y:T7(LL+2)=X1:N
   EXT L
BO 1790 RETURN
TP 1800 GRAPHICS 0:GOSUB 800:? "     MAIN
   MENU":?
NB 1810 ? "1. PREVIEW HOLE":? "2. EDIT HO
   LE DATA":? "3. SAVE DATA":? "4. QUIT T
   HIS PROGRAM":?
CD 1820 ? "YOUR CHOICE";:INPUT CHOICE:IF
   (CHOICE<1 OR CHOICE>4) THEN ? :GOSUB 8
   50:? :GOTO 1810
AY 1830 RETURN
HB 2000 REM PREVIEW THE HOLE (DRAW TARGET
   S)
TX 2004 GRAPHICS 7:POKE 752,1:POKE 708,20
   0:POKE 709,228:POKE 710,206:POKE 712,1
   98:TRAP 3250
RR 2005 COLOR 1:PLOT 0,0:DRAWTO 0,79:PLOT
    159,0:DRAWTO 159,79:COLOR 3:PLOT 0,0:
   DRAWTO 159,0
KJ 2006 PLOT 0,79:DRAWTO 159,79:COLOR 2:P
   LOT 0,0:PLOT 0,79:PLOT 159,0:PLOT 159,
   79
UR 2010 IF T1=0 THEN GOTO 2040:REM DRAWT
   DOWN TRIANGLES
IW 2020 FOR L=1 TO T1:LL=(L-1)*3:X=T1(LL)
   :Y=T1(LL+1):X1=T1(LL+2)
KI 2030 XC=(X+X1)/2:I=1:GOSUB 3000:NEXT L
   :REM DRAW TYPE 1
UW 2040 IF T2=0 THEN GOTO 2070:REM DRAW U
   P TRIANGLES
OZ 2050 FOR L=1 TO T2:LL=(L-1)*3:X=T2(LL)
   :Y=T2(LL+1):X1=T2(LL+2)
EG 2060 XC=(X+X1)/2:I=-1:GOSUB 3000:NEXT
   L:REM DRAW TYPE 2
ZK 2070 IF T3=0 THEN GOTO 2100:REM DRAW R
   IGHT TRIANGLES
XB 2080 FOR L=1 TO T3:LL=(L-1)*3:X=T3(LL)
   :Y=T3(LL+1):Y1=T3(LL+2)
IY 2090 YC=(Y+Y1)/2:I=-1:GOSUB 3100:NEXT
   L:REM DRAW TYPE 3
ZO 2100 IF T4=0 THEN GOTO 2150:REM DRAW L
   EFT TRIANGLES
CC 2110 FOR L=1 TO T4:LL=(L-1)*3:X=T4(LL)
   :Y=T4(LL+1):Y1=T4(LL+2)
SS 2120 YC=(Y+Y1)/2:I=1:GOSUB 3100:NEXT L
   :REM DRAW TYPE 4
DZ 2150 IF T5=0 THEN GOTO 2171:REM DRAW R
   ECTANGLES
XE 2160 FOR L=1 TO T5:LL=(L-1)*4:X=T5(LL)
   :Y=T5(LL+1):X1=T5(LL+2):Y1=T5(LL+3)
CJ 2170 GOSUB 3200:NEXT L:REM DRAW TYPE 5

KR 2171 IF T7=0 THEN GOTO 2180:REM DRAW D
   IAGONAL LINES
SL 2172 FOR L=1 TO T7:LL=(L-1)*3:X=T7(LL)
   :Y=T7(LL+1):X1=T7(LL+2)
GS 2173 Y1=Y+ABS(X1-X):COLOR 2:PLOT X,Y:D
   RAWTO X1,Y1:PLOT X,Y+1:DRAWTO X1,Y1+1
RO 2174 NEXT L:REM DRAW TYPE 7
WX 2180 COLOR 3:PLOT HOLEX+1,HOLEY:DRAWTO
    HOLEX+3,HOLEY:PLOT HOLEX+1,HOLEY+4:DR
   AWTO HOLEX+3,HOLEY+4:REM DRAW HOLE
VE 2190 FOR L=HOLEY+1 TO HOLEY+3:PLOT HOL
   EX,L:DRAWTO HOLEX+4,L:NEXT L
AB 2195 IF T6=0 THEN GOTO 2220
BD 2200 FOR L=BX TO BX+8 STEP 2:COLOR 2:P
   LOT L,BY:DRAWTO L,BY+2:REM DRAW THE BA
   RRIER
RZ 2210 COLOR 3:PLOT L+1,BY:DRAWTO L+1,BY
   +2:NEXT L
ZU 2220 LOCATE STARTX,STARTY,Z:Z=Z+2:COLO
   R Z:PLOT STARTX,STARTY
VB 2230 POKE 764,255:? "HIT ANY KEY TO RE
   TURN TO MENU";
XC 2240 IF PEEK(764)=255 THEN 2240
YK 2250 POKE 764,255:GOTO 240
NV 2300 REM EDIT HOLE DATA
RN 2310 GRAPHICS 0:GOSUB 800:? "EDIT HOLE
   DATA":? :?
EL 2320 ? "ENTER WHICH TYPE OF OBJECT TO
   EDIT":? "1. DOWN TRIANGLES"
MH 2330 ? "2. UP TRIANGLES":? "3. RIGHT T
   RIANGLES":? "4. LEFT TRIANGLES":? "5.
   RECTANGLES"
KR 2340 ? "6. MOVING BARRIER":? "7. DIAGO
   NAL LINES":? "8. INITIAL DATA (HOLE NU
   MBER,HOLE         LOC.,BALL LOC.)"
DG 2350 ? "9. RETURN TO MAIN MENU"
SV 2360 ? :? "YOUR CHOICE";:INPUT ANS:IF
   (ANS<1 OR ANS>9) THEN GOSUB 850:GOTO 2
   360
CX 2370 IF ANS=9 THEN GOTO 240
YG 2380 ON ANS GOSUB 1100,1200,1300,1400,
   1500,1600,1700,1000
QE 2390 GOTO 2310
OQ 2500 REM SAVE DATA TO DISK OR CASSETTE

CX 2510 GRAPHICS 0:GOSUB 800:? :? "PLEASE
    WAIT.  SAVING YOUR DATA..."
HS 2515 ND=(T1+T2+T3+T4+T7)*4+(T5+T6)*5
XS 2520 LINE=(HOLE-1)*20+2000:NUMTARG=T1+
   T2+T3+T4+T5+T6+T7:PLUS=0:COUNT=0:CLOSE
    #1:OPEN #1,8,0,FILES:GOSUB 2710
MT 2530 PRINT #1;HOLEX;",";HOLEY;",";STAR
   TX;",";STARTY;",";NUMTARG;",";:COUNT=5

DZ 2540 IF T1=0 THEN GOTO 2560
DD 2550 TYPE=1:FOR L=1 TO T1:LL=(L-1)*3:X
   X(LL)=T1(LL):XX(LL+1)=T1(LL+1):XX(LL+2
   )=T1(LL+2):GOSUB 2750:NEXT L
GP 2560 IF T2=0 THEN GOTO 2580
LZ 2570 TYPE=2:FOR L=1 TO T2:LL=(L-1)*3:X
   X(LL)=T2(LL):XX(LL+1)=T2(LL+1):XX(LL+2
```

continued on next page

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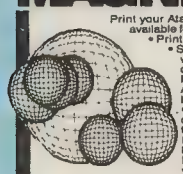

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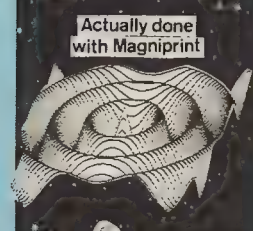

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```
    )=T2(LL+2):GOSUB 2750:NEXT L
AE  2580 IF T3=0 THEN GOTO 2600
UV  2590 TYPE=3:FOR L=1 TO T3:LL=(L-1)*3:X
    X(LL)=T3(LL):XX(LL+1)=T3(LL+1):XX(LL+2
    )=T3(LL+2):GOSUB 2750:NEXT L
BS  2600 IF T4=0 THEN GOTO 2620
CP  2610 TYPE=4:FOR L=1 TO T4:LL=(L-1)*3:X
    X(LL)=T4(LL):XX(LL+1)=T4(LL+1):XX(LL+2
    )=T4(LL+2):GOSUB 2750:NEXT L
FI  2620 IF T5=0 THEN GOTO 2650
BR  2630 TYPE=5:FOR L=1 TO T5:LL=(L-1)*4:X
    X(LL)=T5(LL):XX(LL+1)=T5(LL+1):XX(LL+2
    )=T5(LL+2):GOSUB 2750
KD  2640 PRINT #1;T5(LL+3);:COUNT=COUNT+1:
    ND=ND-1:GOSUB 2765:NEXT L
JB  2650 IF T6=0 THEN GOTO 2680
BX  2660 TYPE=6:LL=0:FOR L=0 TO 2:XX(L)=T6
    (L):NEXT L:GOSUB 2750
PQ  2670 PRINT #1;T6(3);:COUNT=COUNT+1:ND=
    ND-1:GOSUB 2765
CT  2680 IF T7=0 THEN GOTO 2700
DJ  2690 TYPE=7:FOR L=1 TO T7:LL=(L-1)*3:X
    X(LL)=T7(LL):XX(LL+1)=T7(LL+1):XX(LL+2
    )=T7(LL+2):GOSUB 2750:NEXT L
PO  2700 GOTO 240
MM  2710 PRINT #1;LINE+PLUS;" DATA ";:RETU
    RN :REM PRINT NEW LINE
YG  2750 PRINT #1;TYPE;",";XX(LL);",";XX(L
    L+1);",";XX(LL+2);
CX  2760 COUNT=COUNT+4:ND=ND-4
XK  2765 IF (COUNT<21 AND ND>0) THEN PRINT
     #1;",";:GOTO 2780
ZE  2770 COUNT=0:PLUS=PLUS+1:PRINT #1;"":I
    F ND>0 THEN GOSUB 2710:REM NEW LINE
BM  2780 RETURN
BV  3000 REM DRAW TYPE 1 OR 2
LT  3010 LP=Y-I:FOR LQ=X TO XC:COLOR 1:LP=
    LP+I:PLOT LQ,Y:DRAWTO LQ,LP:COLOR 2:PL
    OT LQ,LP:PLOT LQ,LP+I
ZV  3020 NEXT LQ:LP=LP+I
UD  3030 FOR LQ=XC TO X1:COLOR 1:LP=LP-I:P
    LOT LQ,Y:DRAWTO LQ,LP:COLOR 2:PLOT LQ,
    LP:PLOT LQ,LP+I:NEXT LQ
VD  3040 COLOR 3:PLOT X+1,Y:DRAWTO X1-1,Y:
    RETURN
FJ  3100 REM DRAW TYPE 3 OR 4
XN  3110 LQ=X+I:FOR LP=Y TO YC:COLOR 1:LQ=
    LQ-I:PLOT X,LP:DRAWTO LQ,LP:COLOR 2:PL
    OT LQ,LP:PLOT LQ-I,LP
CE  3120 NEXT LP:LQ=LQ-I
WK  3130 FOR LP=YC TO Y1:COLOR 1:LQ=LQ+I:P
    LOT X,LP:DRAWTO LQ,LP:COLOR 2:PLOT LQ,
    LP:PLOT LQ-I,LP:NEXT LP
AP  3140 RETURN
WF  3200 REM DRAW TYPE 5
VU  3210 COLOR 1:FOR LP=Y TO Y1:PLOT X,LP:
    DRAWTO X1,LP:NEXT LP:COLOR 3:PLOT X,Y:
    DRAWTO X1,Y:PLOT X,Y1:DRAWTO X1,Y1
MH  3220 COLOR 2:PLOT X,Y:PLOT X1,Y:PLOT X
    1,Y1:PLOT X,Y1
AO  3230 RETURN
CN  3250 ? "ERROR TRYING TO DRAW THE HOLE"
    :? "PLEASE EDIT AND TRY AGAIN":GOTO 22
    30
```

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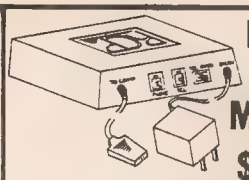

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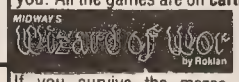

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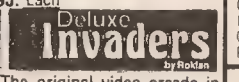

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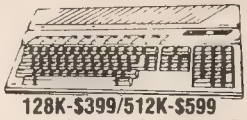

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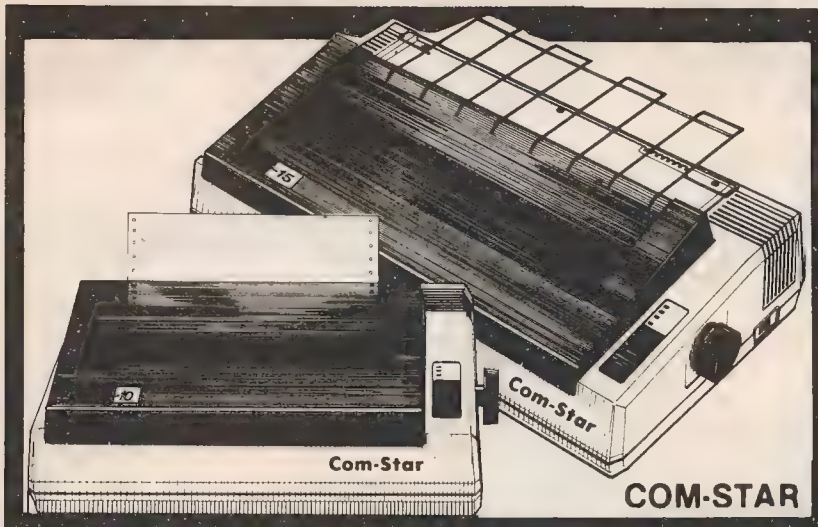

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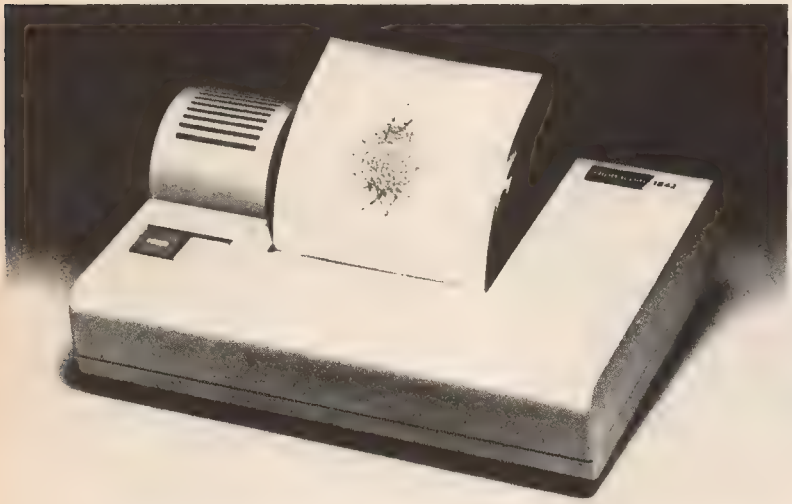

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Print out listings with full computer character sets (interface required, see below). Print in upper and lower case. Comes with a roll of paper and all power adapters needed. Perfect for a spare printer or program lister. List $99.00. **Sale $24.95.**

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Now you can have a printer for the cost of a large box of paper. This printer prints in upper and lower case with true lower descenders. Comes with 1 roll of paper and power adapter. With the intelligent interfaces (sold below) you can do Ascii graphics as well as Atari or Commodore graphics. Plus you can do underlining and expanded modes. Print out pictures, program listings, word processing pages, etc. Perfect for the student or homeowner. List $199.00. **Sale $39.95.**

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product reviews

STAR SG-10

Star Micronics
200 Park Avenue
New York, NY 10166
(212) 986–6770
$299.99

Reviewed by Charles Jackson

Star Micronics' new **Star SG-10** is a dot-matrix printer to get excited about! Offering both speedy draft quality and great-looking "near letter quality," the SG-10 is a worthy successor to Star's deservedly popular Gemini 10X which had printed out **Antic's** listings for the past six months or so.

In "near letter quality" the SG-10 print head passes over each line twice. During the first pass, the print head runs the top half of a line. Then it returns to the left margin and fills in the bottom half. The "near letter quality" mode can be activated with control codes or by a DIP switch on the side of the printer.

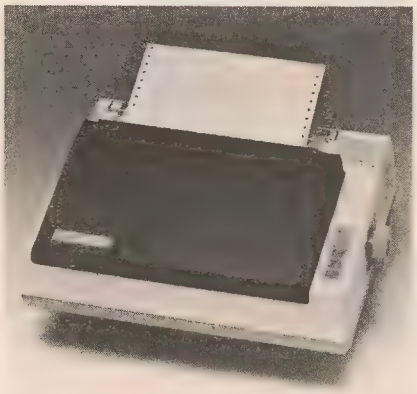
People familiar with Star's Gemini 10X will feel very comfortable with the SG-10. In fact, the SG-10 is essentially a 10X with a slightly different case, "near letter quality" capability and a $100 lower list price. Nearly all of the 10X and SG-10 printer control codes are identical, both use standard typewriter ribbon, and almost any program written for one machine can be used by the other.

Antic has successfully used the SG-10 with AtariWriter, PaperClip, HomePak, Letter Perfect, Print Shop, and every program from our March 1985 Printer Issue, except "Font Maker" (You'll find the fix in this issue's listing section. We had to correct for a 3-byte downloading difference.) We also used the SG-10 "near letter quality" to prepare all the program listings in this issue!

Antic bench tests clocked the SG-10 at 91 characters per second, or about 15 percent faster than the Gemini. In "near letter quality," the SG-10 printed at 22 cps.

The SG-10's 238-page manual is clearer than the Gemini 10X manual was, but it's still not very well organized and lacks an index.

Luckily documentation is not that crucial here. The SG-10 is an extremely versatile, reliable printer that's also simple to install, easy to learn and fun to use.



COMPUTER AMBUSH

Strategic Simulations Inc.
883 Stierlin Rd., Bldg. A-200
Mountain View, CA 94043
(415) 964–1200
$59.95, 48K disk

Reviewed by Dr. John F. Stanoch

Four years ago I came upon a full page ad for **Computer Ambush** in a popular wargaming magazine. By the time I finished reading about the game, I was salivating to play it. However, at the bottom of the ad I discovered that Ambush was only available for the Apple.

Recently I was happily surprised to see that SSI had released an upgraded and revised edition of Computer Ambush for the Atari. In this squad-level game, you are given command of one to ten men in simulating various small unit actions in WWII France.

The non-scrolling multi-screen map depicts a typical village in the French countryside. One can immediately see that this is an Apple conversion, for the buildings and structures are drawn with white lines on a plain black background with only a tinge of faint color sparsely scattered in certain terrain features.

Only about one third of the length of the mapboard can be shown on the screen at any one time. But the column and row are displayed, which greatly helps in combat movements.

Each character in the game is displayed as either a letter or symbol and is controlled via keyboard commands. These commands consist of a two to six digit code which directs the character to perform a particular kind of action including various types of movements, observation, melee, and weapon/explosive usage. The order summary chart included on the included Squad Cards is an invaluable aid.

Each action takes a specific amount of time to perform. After all the commands by both players are given, the actions are simultaneously executed during the computer resolution phase. Afterwards, a player will sometimes be in store for some very nasty surprises.

There are five solitaire and six two-player scenarios with the computer able to play either the American or German side. To win, the player must attain certain conditions specified in the given scenario. These vary from securing the village from enemy troops to staging a successful ambush. There is also an option allowing the players to generate their own scenarios.

This is a difficult game to learn. It took me nearly two hours to digest the twenty-page manual and understand the commands well enough to play somewhat competently. However, the eleven pages of rules are very clearly written, with numerous examples of play.

Also, an introductory scenario is given with suggested first turn commands for the American (noncomputer) player. New players will find it helpful to study and try to understand these first turn commands before issuing their own.

The last eight pages of the manual are devoted to American and German soldier dossiers. I highly recommend for every player to read these after attempting a game or two. Then the soldiers will no longer be just letters and symbols on the screen, but will become actual *characters* whose lives depend on your decisions.

Although this is a difficult game to learn, the player is rewarded with a wealth of options and decisions after mastering the rules. Because this game simulates man-to-man combat in such detail, it could appeal to both wargamers and role-players.

MICROSTUFFER

Microbits Peripheral Products
225 Third Avenue, SW
Albany, OR 97321
(503) 967–9075
$149.95

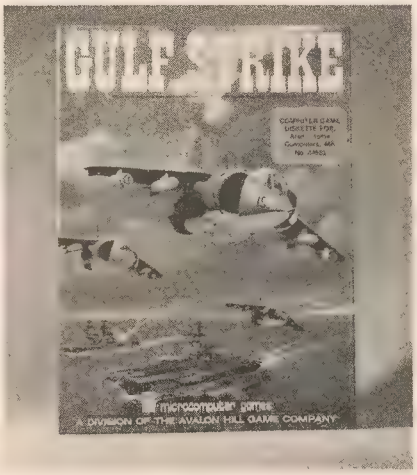
Reviewed by Michael Ciraolo

With a 64K printer buffer like this MPP product, your printer can produce hardcopies of vast reports or programs while you're working at your computer on something entirely different.

The **Microstuffer** works with any printer, and features a clear button, multiple copy repeat function and a full set of self-diagnostic test procedures. A Centronics parallel connector is standard and a serial RS-232 port is optional.

The crew from MPP thoughtfully included complete pin diagrams for their buffer just in case you ever need to make another cable. There's also an extended self-test feature that checks each chip and connection. The buffer comes with a one year warranty against defects in material and workmanship.

What else can we say? **Antic** is currently using a Microstuffer regularly and it works. It holds a whopping big file in its memory. Frankly, aside from bells and whistles, once you've seen one buffer. . .



GULF STRIKE

Avalon Hill
4517 Harford Road.
Baltimore, MD 21214
(301) 254–9200
$25, 48K disk

Reviewed by Dr. John F. Stanoch

One of the hottest flashpoints in the world today is the Persian Gulf. Any conflict occurring here would have a profound effect on the course of history. With this new computer wargame from Avalon Hill, one can explore such a conflict.

In **Gulf Strike** you are faced with directing a combined Iranian/US pro-Western Arab defense against a Soviet and Iraqi invasion.

With a joystick you scroll through a multi-screen high resolution map which depicts most of Iran and all of the Persian Gulf, in 17 different types of terrain. A very nice touch is that you can stack any number of ground, air and sea units. However, orders can only be given to the top 19 units.

In order to win, the US/Iranian player must prevent the Soviet/Iraqi player from capturing nine out of 21 victory point squares within 25 turns. These squares consist of strategic towns and locations, such as Tehran and Oman Point. The game can be won anytime before the 25th turn. The computer then displays the number of enemy hit points each side has eliminated. In the one-player version, the computer plays the Soviet/Iraqi side.

The 44-page instruction manual is both well-written and complete. Although this is not a very hard game to learn, it is difficult to master. A player must not only place the combat units effectively, but also must be constantly aware of the overall strategic situation.

Experienced wargamers would welcome this complexity as something they can really bite into. A complete 25-turn game can take 15 to 20 hours, even though the box states that playing time is one to five hours. The game save feature is a definite necessity.

As with almost any other game, there are a few problems. There are no zones of control and the Soviet/Iraqi player moves after the US/Iranian player, but before combat takes place. So therefore the invaders can move away from the US allies and avoid combat. Also, during the course of one game a "ghost" US/Iranian unit appeared which was able to move but not attack.

I thoroughly enjoyed playing this game. Because of its complexity, I don't recommend Gulf Strike for anyone unfamiliar with wargaming. But to a wargamer, I cannot recommend it highly enough.

continued on next page

product reviews

TRIVIA FEVER

Professional Software, Inc.
P.O. Box 533
Needham, MA 02194
(617) 444–5224
$39.95, 48K disk

Reviewed by Michael Ciraolo

The country's hottest software trivia game is now available for the Atari. **Trivia Fever**, already popular on most leading computers, represents the best in trivia games—as far as trivia goes. As a conversion for the Atari, it's abysmal.

The colors used are Basic Computer Pastels, including several likely to produce upset stomachs in squeamish viewers. The sounds will bring back memories of ballpark music.

Trivia Fever also has the kind of inane computer responses that should have gone out of style ten years ago: "Gee, you must be smarter than you look," and "That was a real tough one." Would you believe, "You must have had your Wheaties this morning?"

But compared to other programs reviewed by **Antic**, Trivia Fever offers the best trivia questions. Choose from serious (not inane) questions in history, sports, films and entertainment, geography, nature and animals, science and technology and famous people. There is also a choice of difficulty levels.

This game works with individuals or teams, and includes three different handicapping schemes to keep the Smart Alecs from ruining everybody else's evening.

Representative mid-level questions include: "Who finally won India's freedom from Britain? Who was the first President to send military advisors to Vietnam? What type of aircraft was first to complete a round-trip transatlantic crossing?"

The game is easy to play, provided you have a "Master of the Group," an individual selected by the players to operate the computer. Your Master will type in everyone's names, set handicapping levels, and tell the computer if the question was answered properly.

If you can tolerate the sound and graphics shortcomings, you'll find a very decent trivia game. In fact, you'll find two games—Trivia Fever can be played without the software. The game comes with a book of questions and answers, a pad of score sheets, and a Category Selector spinner.

CASSETTE ADVENTURES

Level 9 Computing
229 Hughenden Road
High Wycombe
Bucks HP13 5PG
England

Reviewed by Charles Cherry

There are many drawbacks to a cassette-based system, but chief among them is that you can't run real text adventures. Let's face it, a computer without a cavern is merely useful. However, help is here at last from a most interesting place.

While traveling in England I ran across Level 9 Computing. It seems these people are the leading adventure game company in the U.K. They market a series of top notch games for home computers. But there are relatively few British Ataris with disk drives, so the games are released on cassette.

Sophisticated compacting has squeezed everything into 32K. After the cassette loads (over 10 minutes!), you enter a large world. You'll find over 200 rooms with detailed descriptions, a good parser with a large vocabulary, lots of creatures and a little humor. All in RAM. And since it does not have to spin a disk, responses are very fast.

There are presently 6 games available. The first one, **Colossal Adventure**, is a faithful recreation of the original "Colossal Cave" mainframe adventure game. But once you finish, the story expands with 70 more rooms that tie into J.R.R. Tolkien's *Lord of the Rings* trilogy.

The next two games, **Adventure Quest** and **Dungeon Adventure**, continue this "Middle Earth Trilogy" although each can be played as a stand-alone game. If you get claustrophobic in caves and dungeons, please note that Adventure Quest takes place outside.

Science fiction fans can explore **Snowball** and **Return to Eden**, two-thirds of the "Silicon Dream Trilogy." Snowball takes place on a giant spaceship taking 2 million cryogenically frozen colonists to a distant solar system. However, something has gone wrong and you are awakened to deal with it. This game has over 7,000 rooms and is already a classic in England.

Return to Eden is the story of the planet when Snowball arrives. I have not spent any time with it yet, but I understand it's a jungle planet and there's a character named Pepsy Koala. **The Worm in Paradise** will be out soon to complete the series.

The final game, **Lords of Time**, sends you into nine different epochs. You travel from the Ice Age to the Dark Ages to the Future. The worlds in each era are necessarily small, but this makes it an excellent beginning adventure.

Getting your hands on these games is an adventure in itself. You'll need to visit your local international bank and get a check drawn in pounds sterling. Each program costs 9.90 Pounds. At today's exchange rate that is about $12. This price includes airmail postage from England. You can get an entire trilogy for the price of one U.S. disk adventure.

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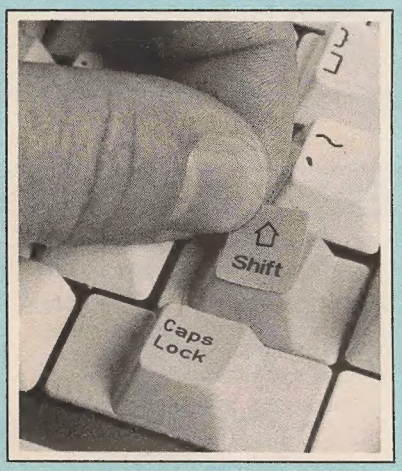

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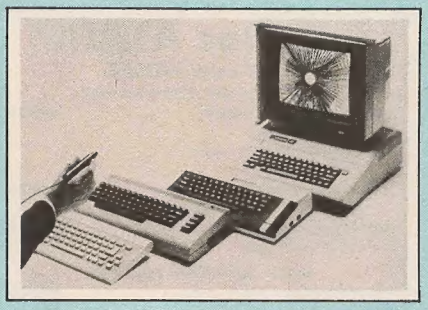

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